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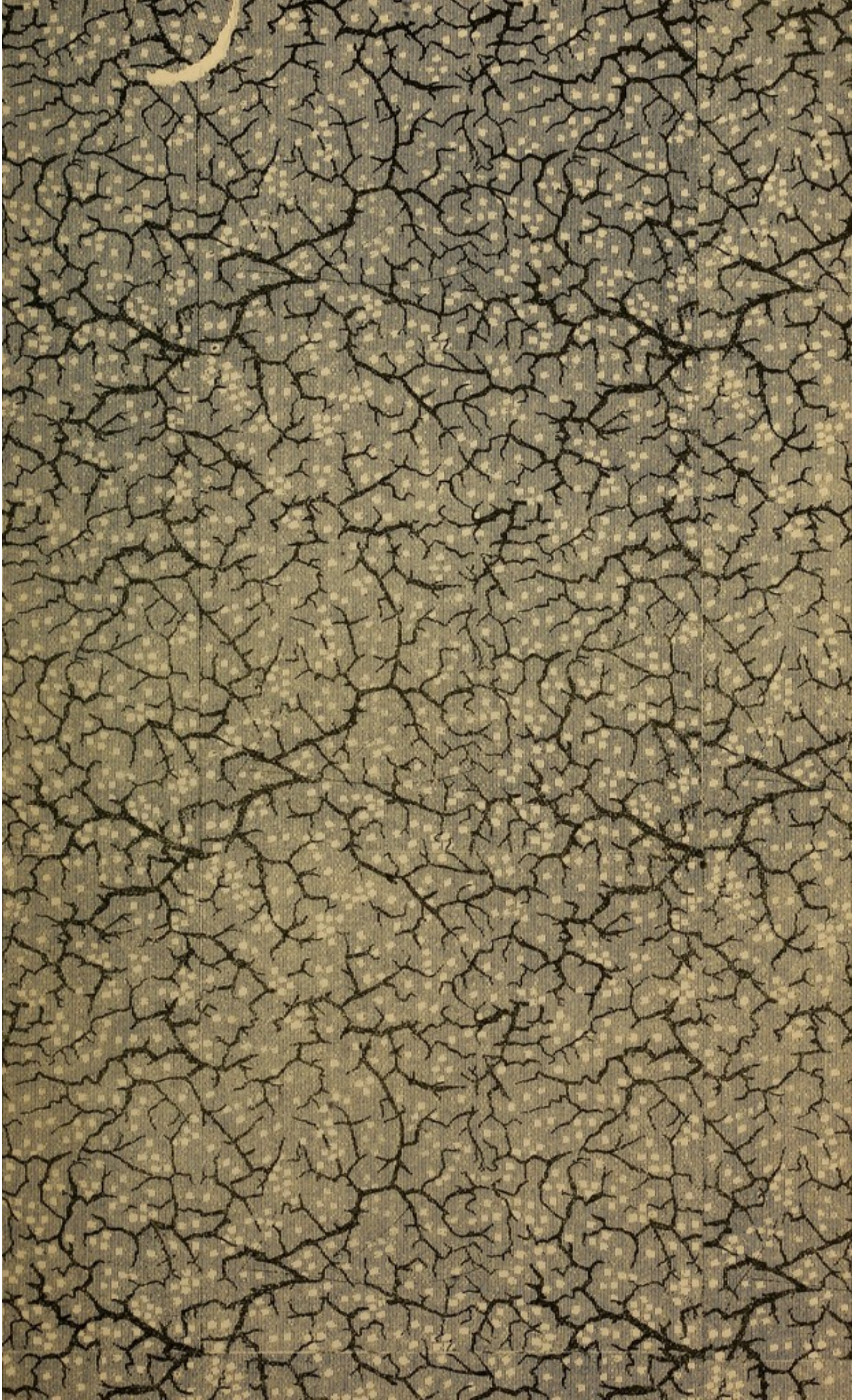

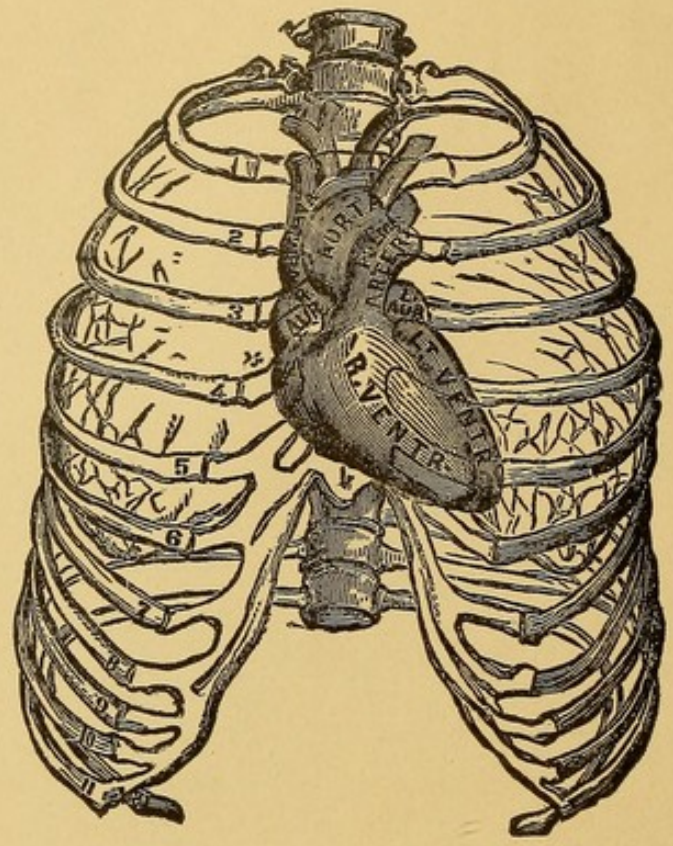
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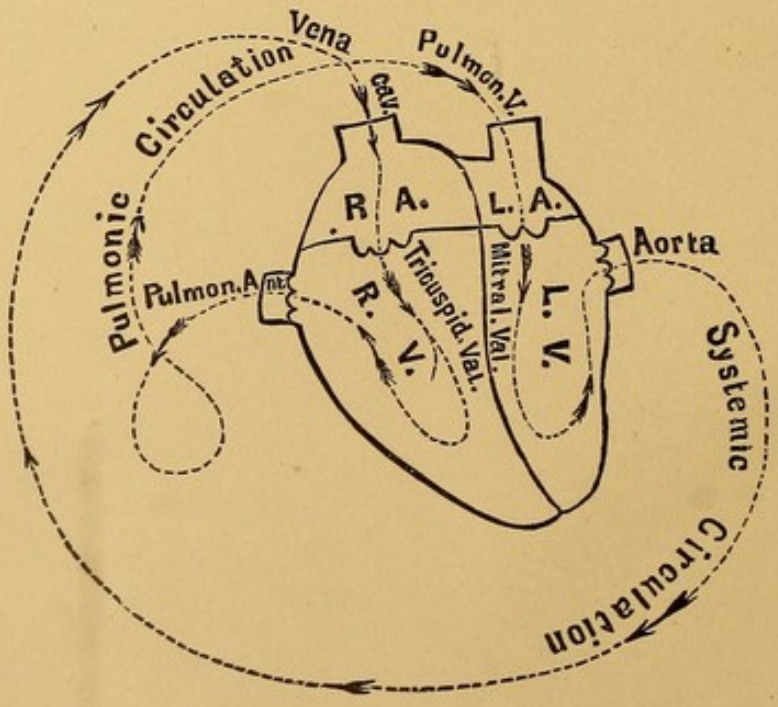
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Systemic Circulation

LECTURES

ON

DISEASES OF THE HEART

WITH

A MATERIA MEDICA OF THE NEW HEART REMEDIES.

BY

EDWIN M. HALE, M.D.,

SPECIAL LECTURER ON DISEASES OF THE HEART; AND LATE PROFESSOR OF MATERIA MEDICA AND THERAPEUTICS OF NEW REMEDIES IN HAHNEMANN MEDICAL COLLEGE; EMERITUS PROFESSOR OF MATERIA MEDICA AND THERAPEUTICS IN THE CHICAGO HOMŒOPATHIC MEDICAL COLLEGE; AUTHOR OF "SYMPTOMATOLOGY AND THERAPEUTICS OF NEW REMEDIES," ETC., ETC.

WITH

A REPERTORY OF HEART SYMPTOMS

BY

E. R. SNADER, M.D.,

LECTURER ON PHYSICAL DIAGNOSIS IN HAHNEMANN COLLEGE OF PHILADELPHIA.

IN SIX PARTS.

THIRD EDITION—GREATLY ENLARGED.

PHILADELPHIA:

F. E. BOERICKE,

HAHNEMANN PUBLISHING HOUSE.

1889

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TO

David S. Smith, M. D.

OF CHICAGO,

THE FIRST HOMŒOPATHIC PHYSICIAN

IN THE NORTHWEST;

THE FIRST PRESIDENT OF HAHNEMANN MEDICAL COLLEGE OF CHICAGO;

THE FIRST PRESIDENT OF THE ILLINOIS STATE HOMŒOPATHIC MEDICAL SOCIETY;

THIS VOLUME IS

RESPECTFULLY DEDICATED.

PREFACE

TO THE SECOND EDITION.

THE Lectures contained in this volume were delivered before the Class of Hahnemann Medical College, Chicago, during the winter of 1870–71. I was appointed by the Faculty of the College to give a special course of Lectures on Diseases of the Heart and their homœopathic treatment. The satisfaction manifested by the class emboldened me to publish them. The reception of the first edition by the profession was so favorable, that a second has been demanded. To the original volume I have added an Appendix containing several papers on Cardiac Disorders, read before the Illinois State Homœopathic Medical Society; also a copious Index, which may be of value to the student and practitioner.

As it is manifest that but little that is new or original relating to the Etiology and Diagnosis of diseases of the heart can be presented, I cannot be criticized for quoting largely from standard authorities on that subject. The treatment, however, is in accordance with the doctrines first promulgated by Hahnemann. The therapeutics is enlarged by addition of new remedies not recommended by other authorities. While I accord the largest liberty in the matter of dose, I have advised the quantities and attenuations which have been most successful in my hands, or that are indicated by my law of dose, which I have fully explained herein.

CHICAGO, April, 1875.

PREFACE TO THE THIRD EDITION.

It is now six years since the Second Edition of Dr. Hale's Lectures on Diseases of the Heart was issued.

Since that time great advances have been made in cardiac pathology and therapeutics, and it has been thought best by the author and publisher to enlarge the book and bring it up to the present status of the healing art.

This Third Edition is a volume of 478 pages, double the size of the last. It contains several elaborate and practical essays on the various subjects connected with cardiac diseases, the results of the Author's latest studies and clinical experience.

In addition it contains a complete Materia Medica of all the new cardiac medicaments. In no direction has there been a greater advance in cardiac therapeutics than in the discovery and investigation of drugs which have a specific affinity for the heart and circulatory system. Digitalis does not now stand alone as the principal heart remedy. It is a typical drug only, and around it are grouped others almost as important—namely, Adonis, Barium, Cereus, Convallaria, Caffeine, Oleandrine, Sparteine, Strophanthus, Kola and others.

Some of these have been proved on men and animals, and all have further substantiated their claims as valuable cardiac remedies by a large clinical experience in both schools of medicine.

In the presentation of these remedies the Author has collated this experience, drawing freely from all sources. He

has also given his own views of their method of action and laid down the indications for their use, the dose, etc.

A very valuable addition to this Edition is a complete Repertory of Heart Symptoms. This has been prepared by E. R. Snader, M.D., Lecturer on Physical Diagnosis in the Hahnemann College of Philadelphia, and will prove an invaluable aid to the practitioner in the treatment of those cardiac affections which require the perfect *similimum* in the remedy selected.

The profession need not be reminded that this is the only classical text-book on the Homœopathic Treatment of Diseases of the Heart used in our School.

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PART I.

FUNCTIONAL DISORDERS OF THE HEART.

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LECTURES ON

DISEASES OF THE HEART.

INTRODUCTORY LECTURE.

The Wonders of the Heart — Its Functions — Increased Frequency of its Diseases — Its Anatomical Peculiarities — Its Circulation — Its Innervation — Its Nervous System — When it Begins to Beat — Pathological Deductions.

GENTLEMEN: I approach the subject upon which I have been appointed to lecture with the fullest and deepest sense of its importance. Diseases of the heart, from their very nature, and the paramount importance of the organ affected, should claim the interest and profound attention of all thinking and conscientious physicians. I do not wish to exaggerate the importance of cardiac diseases, or give a false estimate of their frequency, but I have no hesitation in asserting, that my observations in a large practice of twenty years have convinced me that diseases of the heart, and especially functional disorders of that organ, have largely increased within the last decade. It may be owing to the fact that the latter half of my years of practice have been spent in a great city, that I have come to this conclusion. The intense strain upon the nervous energies incident to the business and pleasures of a city life, do certainly have much to do in the causation of certain heart diseases. In the country, life is calmer, and its tide flows slower, and the vital energies are less subjected to violent aberrations.

In view of these facts, it becomes us to study well this organ—the heart—in all its relations, not only anatomically, physiologically, but psychologically. And in order to do

this, we must first inquire into the character of this organ. Is it merely an appendage to the body—an organ of elimination or secretion? Or is it the centre of the blood-system, just as the spinal cord is the grand centre of the nerve-system, and the brain the centre of the mental forces?

As the brain animates the body with intention and purpose, and the lungs give it corresponding motion, the heart, as the blood's executive power, gives corporeal substance to the frame, inasmuch as the body itself arises from the blood. The existence of the human machine depends upon the heart, but its usage upon the lungs and brains. The heart is the source whence the finished blood descends to the organs throughout the system, and, as the life is in the blood, the heart is the agent for bestowing that life upon the organization. In a word, the heart, or blood, determines the fleshly tenement.

ITS ANATOMICAL PECULIARITIES.

Anatomically the heart is a conical, hollow muscular organ, lying obliquely in the chest, between the two lungs, the base of the cone pointing upward in the direction of the right shoulder, the apex pointing to the space between the fifth and sixth ribs. It rests upon the tendinous portion of the diaphragm, which is the partition between the chest and the abdomen, and it is encased in a peculiar bag or capsule, the pericardium; which consists of two layers; the outer, fibrous, by which the pericardium is attached to the great vessels at the root of the heart; the inner, a serous layer, continuous with the serous membrane which covers the outer surface of the heart. The cavity between the heart and pericardium, thus lined by a serous covering, generally contains more or less fluid, whereby the heart is lubricated on the outside, and its local motions are rendered easy.

The heart comprises four cavities, two auricles, and two ventricles; one auricle and one ventricle being on each side, and the right pair of cavities being devoted to the circulation of the venous blood, the left pair to that of the arterial blood. The auricles are at the top, constituting the base of the heart; the ventricles form the apex; the latter are much

stronger than the auricles, consisting of very thick muscular walls, the reason of which we shall see presently.

THE CIRCULATION OF THE BLOOD.

The heart is a peculiar muscle, and when any of its four cavities contract, they have the power of expelling their contents, the force of the expulsion being the prime mover of the circulation of the blood. We may begin the circle where we please and we shall find that it returns into itself. Starting, for instance, from the *left* ventricle, we see that the blood is driven, by the contraction of that cavity, into the aorta—the highway which leads into all the arteries of the body; through these the blood is discharged into the veins, which unite to form at last only two great trunks the venæ cavæ, which are again the thresholds of the heart, and debouch into the right auricle. The blood which has now passed from the left ventricle to the right auricle, has still a journey to make before it completes its course. Accordingly, from the right auricle it is forced into the right ventricle, and by the right ventricle into the pulmonary artery, which conveys it to the lungs, where it ramifies through the multiple branches of that artery, and whence it is brought back by the pulmonary veins, forming ultimately four large trunks, which empty into the heart's left auricle, by the contraction of which the blood is next forced into the left ventricle, to the place from which we began.

Without entering into a description of the complete circulation of the blood throughout the body, with which you are all doubtless familiar, we will consider a more important and interesting subject, namely: the circulation of the blood in the heart *itself*.

THE CIRCULATION IN THE HEART.

That there *must* be a circulation in and through the heart is evident; for how else could the heart be nourished? The heart is supposed to be nourished by the *coronary* vessels; they are called coronary from *corona*, a crown, because they run in crowns or coronal circles around the heart. They

arise from the aorta, close beside the semi-lunar valves, and running around the base of the heart, and sending branches down the lines of partition between the four-fold chambers, they form a kind of vascular cage-work in which it is contained. The coronary veins, said to begin from the minutest twigs of the coronary arteries, by their considerable branches for the most part accompany those of the arteries, and discharge themselves by one, two, or three orifices, into the right auricle. The interior of the four cavities of the heart is not a smooth, even surface, but is rendered extremely irregular by muscular columns, projections, and partitions; it is scooped, channelled, and caverned, besides which, on the walls of the cavities there are minute openings, the foramina of Thebesius, which are supposed to be the mouths of little veins.

It is a curious fact that nearly all the old anatomists, and some also of the moderns, have suspected a puzzle in these coronary vessels. They come from the aorta, and run backward to the heart. In a certain proportion of cases, estimated as 5 in 20, one or more of their orifices lies behind the semi-lunar valves, and such orifices, it is clear, cannot receive the streams propelled from the heart, because it lays down the valve flat upon them, and effectually closes them. As, therefore, nature's law must be constant, it was argued that what holds of one orifice must hold of all, and that the blood runs back into the coronaries from the aorta when the heart's contraction ceases. This was Boerhaave's opinion.

Swedenborg, however, one of the profoundest anatomists and physiologists of any age, propounded another view. He argued that the raising up of the semilunar valves during the contraction of the heart, when the blood is expelled into the aorta, precludes its passage then into the coronaries, and that the stretching of the coronaries, and their pressure by the full aorta, contributes to the same preclusion. He held that the coronary arteries do not arise from, but terminate in the aorta; that they are veins relatively to the heart, although running into the beginning of the arteries of the body. The doctrine, in brief, is this: that the heart, as the head of the vessels and the fountain of the blood, itself

requires the firstling blood for the exercise of its noble offices, and cannot hold its life by tenure from one of its own arteries, which would be to invert all ideas of the order of nature.

The heart is already full of blood, and if fluids, or fluid persons, like solid persons, move with greater velocity in proportion to their life, the best blood in this race will continually outrun the rest, and always first in the heart, will skirt along its porous walls. Now, what structure do we find upon these walls, but caverns, jagged cavities, and at the bottom of these a number of little holes, the foramina of Thebesius. Into these caverns, then, miniature ventricles in the great ventricle, hearts of the heart, the quickest blood is received, and the pores open with all their hearts to take it in. And when the heart contracts, it drives out the general blood of the body into the grand aorta, but its own particular blood, detained in the cavernous lacunæ, it squeezes, slippery with spirit, through its walls, into its muscular substance, and thence onward and outward to the surface, into the coronary arteries and the coronary veins, from which there is a reflux, when necessary, into the auricles and ventricles.*

According to this explanation, which we cannot hesitate to accept, the heart has a circulation of its own, which gives it a power to maintain its own constancy in the midst of the fluctuations of the blood, and to make it the head, ratio, or balance, as well as the heart, of the too-mobile circulation.

Again, according to this view, the varying quantities of the blood returned upon the heart, find an outlet through the walls of the heart itself, and equilibrium is thus maintained by the coronary vessels; so that the heart, *plus* the coronaries, equals all the forces of the circulation; while the heart, *minus* the coronaries, is a comparatively regular force uninfluenced by the general state of the system. Were it not for such provision, the heart would be at the mercy of extraneous influences; the most important organ of the trunk would have no stability, would in the end yield, and

* Dr. Wilkinson—"The Human Body and its Connection with Man."

be distended into a bladder or membrane, incapable of anything but the most passive recipiency.

Next to the consideration of the circulation of and in the heart, and its nutrition, the next in importance is

THE INNERVATION OF THE HEART,

Or, the nervous circulation or nervous forces which impel and regulate the motion of this wonderful organ. The heart is endowed, above all other organs, with a property which has been termed *irritability*, by which is meant the capability of being easily excited to movements of contraction alternately with relaxation.

After the heart has been removed from the body, and has ceased to contract, a slight irritation will cause it to execute, not one movement only, but a series of alternate contractions and dilatations, gradually diminishing in vigor until they cease. The contraction begins in the part irritated, and then extends to the rest. And it appears that it is the muscular tissue alone that possesses this peculiar property, for if the parts of the heart experimented upon are connected by tendons the irritation will not extend through such connection. This irritability is less speedily lost in cold-blooded than in warm-blooded animals. The heart of a frog will go on pulsating for many hours after its removal from the body; and the heart of a sturgeon when inflated with air, continues to beat until the auricle absolutely becomes so dry as to rustle during its movements.

Not only will the *whole* heart continue to beat when removed from the body, but even small and isolated portions will contract and relax with great regularity. Cut the heart lengthwise into two halves, and each half will continue beating. Cut it across, through both auricles and ventricles, and both sections will beat as before. The auricles will persist in their rhythmical action when cut off above the auriculo-ventricular rings, and the apex of the heart will do the same when separated from the rest of the ventricles.

This is one of the spectacles which assail the mind of the student with somewhat of a tremulous awe. The beating of the heart, which from his childhood he has learned to

associate, in some mysterious manner, with life and emotion, he here sees occurring under circumstances removed from all possible suggestions of emotion or life. All connection with the spinal cord is severed. The brain cannot send to it any voluntary influence. The blood no longer courses through it, to give it motion by contact or otherwise. What then causes the heart and each separated portion to continue their rhythmical pulsations? This irritability does not depend upon the cerebro-spinal system, for it has been proved that the heart's action will continue in the body after the brain and spinal cord have been removed. For many years no explanation could be given of this wonderful self-life of the heart. We now know that the heart has a *nervous* system of its own, as well as a *circulation* within itself.

In the substance of the heart is a complete little nervous system, consisting of ganglia and nerves, and is not made up of the nerve filaments which come from the *pneumogastric* nerves. From these ganglia nerves are distributed through its muscular substance. It is to this nervous apparatus that we must ascribe the spontaneous action of the heart; for if any part be severed form all connection with the ganglia the pulsations will cease at once, but if the smallest severed portion of a heart contains a ganglion the pulsations will continue. In other words, it retains its irritability. The movements during life or death are due to these ganglia. No other ganglia in other parts of the body retain their power after the circulation has been destroyed. In view of this, we might almost believe the fanciful notion that the heart was a sentient organism—a being within a being!

But the most wonderful thing about the heart remains to be told. *It pulsates in the embryo long before it contains blood, and long before any nerves have been developed in it—when, indeed, it is nothing but a mass of cells!* What is the essential nature of these cells? Does each one possess the property of spontaneous movement? Do we know the nature of the stimuli which cause this movement? And when does this movement begin?

WHEN DOES THE HEART BEGIN TO BEAT?

In discussing this question, a certain eloquent writer says:

"The essential unity of the rhythmic beat of the heart, and the amœboid movement of protoplasm, are well shown by the history of the new-born heart. In the chick growing within the egg the heart begins to beat very early, while as yet it is built up of nothing but protoplasmic cells. Many authors, over-jealous, as it seems to me, for the prerogative of nerve-cells, find satisfaction in affirming that these constituent cells of the young heart, though apparently alike in structure, are various, some being potentially nerve-cells, others potentially muscle. To my mind, each and every cell is not only potentially, but actually, both nerve and muscle. So long as they are still cells, that is, still tiny masses of untransformed protoplasm, each enjoys all the powers of life. What befalls them afterwards is not gain, but limitation and loss. Some cells lose the power to move, and so become nerve-cells; other cells lose (to a great extent, at least) the power to originate impulses, and so become muscular. Very interesting is it to watch how the slow, irregular, drawling movements of the primordial protoplasm are gradually transformed and gathered up into the sharp, short stroke of the heart's beat. We speak, in common language, of the heart of the chick as beginning to beat on the second or third day of incubation. It is then that its beat becomes obvious to our senses as a beat. But, in reality, it never does begin to beat. There is no sharp line of demarcation between the protoplasmic crawl and the true rhythmic spasm; the one, little by little, merges into the other. To borrow an illustration from music, it might naturally be imagined that the matter took place in this wise: We might fancy that the tiny cells were marshalled in their places round the cavity of the heart, as musicians are marshalled in an orchestra, fully equipped with powers of rhythmic pulsation, but quiet and inactive; and then, that at a wave of the wand of the great conductor, at the moment when fuller life was breathed into every cell, all struck up in unison with the heart-beat. We might fancy, I say, that this was how the first stroke was wrought. But

it is not so. To gain a truer image of the process, we must think of ourselves as listening with eagerness, a long way off, to a multitude of performers assembling together, each playing on the same instrument, but playing in a different way, though all trying to learn the same tune, and all gradually drawing near to us. As we listen to them with stretched ear, coming nearer and nearer, and as, at each moment, more and more performers fall into the one proper time, the initial discordant noise, as it gathers in intensity, also gradually puts on a definite form, and at last there comes a moment when we say, 'Now I hear them! now I have the tune!' So it is with the growing heart. Looking at it earnestly with the microscope, we may fancy ourselves witnesses of how the cells, as they assemble together, little by little exchange the all-sided flow of protoplasm for the limited throb of a muscular contraction, gaining in force what they lose in form. And so there will come a time when we can say, 'Now I can see it beat;' though in reality it has been beating a long time before." *

PATHOLOGICAL DEDUCTIONS.

From a pathological point of view, this peculiar nervous structure of the heart is important. It teaches us that certain diseases of the heart may originate within itself—*i. e.*, are *idiopathic*. Especially may this be the case with the disorders known as functional or nervous. Thus, in some cases the functions of the body may be perfectly healthy, while the heart is disordered. *Its* nervous system may be deranged, while that of the body may be in perfect health.

We are also taught, by the fact of the heart's peculiar irritability, that we cannot always decide on the existence of life or death from the presence or subsidence of its movements. The heart may be still beating in the body while the body has been dead for hours; and the heart may cease to beat while the body lives. The hearts of decapitated criminals have been observed to beat two, four, and even seven and twenty hours after the operation! On the other

* Dr. S. Foster—"Wonders of the Heart."

hand, many instances have been known where the heart's action could not be discovered for hours, yet the patients recovered. In those morbid conditions known as trance and catalepsy, the heart's action may appear to be suspended for hours, days, and even weeks—the patient meanwhile retaining consciousness. In this condition of apparent death many persons have been buried, and some remarkable cases of burial and resuscitation are on record. In syncope or fainting the consciousness is lost, no action in the heart can be perceived, even by auscultation, for many minutes, yet by the proper use of stimuli the patients recover. M. Bouchat says if the heart's action ceases beyond five minutes death is certain, and he declares that the circulation can be *heard*, when it can be detected by no other means, but this assertion is open to much doubt.

But aside from this self-life which the heart possesses, it has a life imparted to it from the brain and spinal cord. The heart receives nerves from the cerebro-spinal system, and also from the sympathetic. From the former it is supplied by the cardiac branches of the pneumogastric and the lately-discovered motor and sensory nerves, which go to the heart directly from the spinal cord; but the pneumogastrics may be severed at their origin, and the heart continue to act; and, what is more astonishing, the cerebro-spinal centres may be removed from an animal without arresting the heart's action. In those monstrosities sometimes called into being, no brain or spinal cord exists, but they nevertheless possess a regularly pulsating heart. The heart may be isolated from all connection with the sympathetic system, and yet continue to pulsate.

These are important facts for you to remember, in connection with the use of the medicines for the relief of cardiac diseases. A remedy may act upon the cerebro-spinal or the sympathetic systems; but if these systems refuse to respond to the medicinal stimuli, the heart will not feel the action of the curative agent. On the other hand, a remedy may act on the heart, even if the nerves leading from the great centres of the two systems are severed or paralyzed, for it may act by being carried in the blood directly to the heart, there to act upon the ganglia which lie in its structure.

THE PHYSICAL POWER OF THE HEART.

Another wonderful thing about the heart is its immense physical power. It is built up of muscular fibres in such a way as to give it a strength possessed by few other muscular structures. Every time it pumps blood into the arteries it exerts a force which is estimated at *thirteen pounds*. The usual force constantly exerted by the healthy human heart, it is estimated, would sustain a column of blood 7½ feet high, the weight of which would be about 4lbs. 6oz. Imagine, if you will, an organ exerting this immense force — hour after hour — day after day — year after year — and you can form some idea of the aggregate power of the heart during the life of a man. Not only is the power of the heart wonderful, but its sensitiveness is peculiar and unparalleled. As the blood courses through its substance, even into its innermost recesses, it feels the presence, in some way or other, of everything which has found its way into the blood. All poisons, the elements of maladies, the essential portions of all nutritive material, and even the emotions of the mind, influence the heart's motion, and the beat is altered by such influences. Disease may accelerate its pulsations to 140 or 150 per minute, or cause them to sink as low as 25 or 30. So is it with certain medicinal agents. By their use we can alter the heart's force, the frequency of its beats, its regularity of rhythm, and other qualities.

The heart is influenced by all the forces in nature; by all mental and physical influences. "Hence, also, it is that it never wearies. Let me remind you of the work done by our hearts in a day. A man's total outward work, his whole effect upon the world in twenty-four hours, has been reckoned at about three hundred and fifty foot-tons. That may be taken as a good 'hard day's work.' During the same time, the heart has been working at the rate of one hundred and twenty foot-tons. That is to say, if all the pulses of a day and night could be concentrated and welded into one great throb, that throb would be enough to throw a ton of iron one hundred and twenty feet into the air. And yet the heart is never weary. Many of us are tired after but feeble labors; few of us can hold a poker out at arm's

length without, after a few minutes, dropping it. But a healthy heart, and many an unsound heart too—though sometimes you can tell in the evening, by its stroke, that it has been vexed during the day, that it has been thrown off its balance by the turmoils and worries of life—goes on beating through the night while we are asleep, and, when we awake in the morning, we find it at work, fresh as if it had only just begun to beat. It does this because upon each stroke of work there follows a period, a brief but a real period, of rest, because the next stroke which comes is but the natural sequence of that rest, and made to match it; because, in fact, each beat is, in force, in scope, in character, in everything, the simple expression of the heart's own energy and state." *

We will now consider the heart psychologically, or the

RELATIONS BETWEEN THE MIND AND THE HEART.

The heart is one of the so-called involuntary muscles, an organ which is supposed to be beyond the influence of the *will*, if not of the mental sphere. But this view of the nature of the heart's relation to the mind is not entirely correct, for, as Dr. Holland has remarked, "the action of the heart is often quickened, or otherwise disturbed, by the mere centreing the consciousness upon it, without any emotion or anxiety. On occasions where the beats are audible, observation will give proofs of this, or the physician can very often infer it while feeling the pulse, and when there is liability to irregular pulsation, such action is seemingly brought on, or increased, by the effort of attention, even though no obvious emotion is present."

Dr. Murray, writing of "Emotional Disorders," says, "The heart is an organ highly susceptible of emotional excitement, and even the strongest *volition* and coolest temperament will not give immunity from this susceptibility. Thus easily excited, in those of nervous temperament the organ is ever been disturbed by emotion. Note, for instance, the palpitation or paralysis of fear, and the intermittent

* "Wonders or the Heart," by Stephen Foster.

action of a weak or unhealthy organ when it is under the influence of emotional excitement. Further, we have more than once noticed, that long-continued anxiety will lead to a weak and slow action of the heart, causing the pulse at the wrist to fall below its normal standard, both in frequency and force, and at the same time rendering the organ liable to become excited and turbulent on the slightest accession of new emotional feelings."

Indeed, such is the influence of emotions on the heart, that a sudden and painful shock to the feelings has been known to arrest its action, or to excite it to an action so turbulent as to injure its valves or their tendinous cords. The phrase "died of a broken heart" is is not purely figurative, for the heart has been *ruptured* by violent emotions, resulting in sudden death.

Terror may paralyze the heart, and so may joy when it suddenly seizes upon a person already overpowered by despair. The Roman matrons, after the battle of Cannæ, on seeing their sons, whom they supposed to have been killed, dropped down dead on the spot. *Fear*, the chronic form of fright, occasions a tremulous palpitation, not the full, bounding beat of energy or courage. *Rage* produces præcordial oppression, and has been known to bring on an attack of angina pectoris. I have known excessive grief, from disappointed affection, to cause not only functional disorder, with irregular and feeble pulse, but those abnormal sounds in the heart which indicate deranged action of its valves, while, at the same time, the patient grew pale and anæmic. As a rule, hope will excite and sustain the organ; despair and anxiety will depress it; and contentment and peace of mind will give it healthy action.

It is my conviction that but few physicians have realized the importance of the subtle relations of the brain or mind with the heart; or appreciate the connection between the soul and that centre of physical life. We might go so far as to assert, that as there is a corporeal heart, which is the life-giving centre of the body, so there must be a spiritual heart, which is the centre of soul-life. Else, why do we continually use the word "heart," as applied to the feelings, impulses, and emotions? We say, a man "has a heart," or

"no heart," that such an emotion "comes from the heart," or "comes from the head," indicating thereby that one kind of feeling or impulse may be from the soul, and another from a more "calculating" origin. All the grand, noble, loving, and impassioned impulses of our nature are said to come from the "heart;" while the cold, unemotional, and more practical acts are said to emanate from the brain. As a rule, what is deeply rooted in the natural convictions and expressions of the people, has its origin in truth, and so is this accepted correspondence between the feelings and the passions of the soul, and the physical heart, based upon a correspondence between the heart, which is the central life of the body, and love, which is the central life of the soul.

But the *will*, as well as the emotions, may affect the heart. Many cases illustrative of this assertion are on record. The best authenticated case is that of a Col. Townsend, of Baltimore, which was described by Dr. George Cheyne, who was a witness of the fact. The case was that of a gentleman in apparent health, who by an effort of the *will* could at any time cause an *apparent* cessation of all the vital functions, so that the *heart's action could not be perceived*, nor any respiratory movements be observed.

It is a fact well known to anatomists, that animals possess the power to move and govern certain muscular organs and muscles, while man, possessing the same muscular structures, has no apparent influence on them. How far this influence extends to the heart is a problem which may well attract our attention. We should not overlook this sympathy between the mind and the heart. A full appreciation of it may lead us to form opinions and diagnoses, which could not otherwise be correctly made. A physician may be treating the heart with medicines, when his efforts *should* be directed to a "mind diseased." We should never lose sight of the psychological relations of the heart, as well as its anatomical, physiological, and pathological history.

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* Treatise on Nervous Diseases, p. 307.

LECTURE II.

Circulation of Blood through the Heart — Location of the Heart — Space over which Normal Dullness is found — Sounds of the Normal Heart — Sounds of the Abnormal Heart.

GENTLEMEN: Before I proceed to describe the Diseases of the Heart, it is proper that we inquire into the method of the circulation of the blood in and through that organ.

The *venous* blood which is returned by the ascending and descending vena cava, enters the *right* auricle during its diastole.

Part of it flows on into the right ventricle during the earlier part of its diastole; but the auricle being filled before the ventricle, then contracts, and discharges its contents through the *tricuspid valves* into the ventricle, which it thus completely distends.

The reflux of blood into the veins during the auricular systole, is impeded by the contraction of their own walls, and by the valves with which they are furnished; but these valves are so formed as not to close accurately, especially when the tubes are distended; so that a small amount of reflux usually takes place, and this is much increased when there is any obstruction to the pulmonary circulation.

Whilst the *right* ventricle is contracting upon the blood that has entered it, the *carneæ columnæ*, which contract simultaneously with its proper walls, put the *chordæ tendinæ* upon the stretch, and these draw the flaps of the *tricuspid valve* into the auriculo-ventricular axis.

The blood then getting behind them, and then being com-

pressed by the contraction of the ventricle, forces the flaps together in such a manner as to close the orifice; but they do not fall suddenly against each other, as is the case with the semi-lunar valves, since they are restrained by the chordæ tendinæ, whence it is that no sound is produced by their closure.

The blood is expelled by the ventricular systole into the pulmonary artery, which it distends, passing freely through its *semi-lunar valves;* but as soon as the *vis a tergo* ceases, a reflux might take place by the contraction of the arterial walls. The valves are filled out by the backward tendency of the blood, and completely check the return of any portion of it into the ventricle.

The blood after having circulated through the lungs, returns as arterial blood by the *pulmonary veins* to the *left* auricle; whence it passes through the *mitral* valve into the left ventricle, and thence into the *aorta* through its semi-lunar valves, in the same manner as that on the other side.

We will now proceed to describe and determine the

LOCATION OF THE HEART,

and *the space in which normal dulness is found.*

The heart is situated between the cartilages of the third and sixth ribs. The upper extremity, or base, is defined with sufficient precision by the upper margin of the third rib. The point or apex generally extends to the fifth intercostal space, near the junction of the rib to its cartilage. The organ is situated obliquely within the chest, a line passing through the longitudinal axis, intersects obliquely the clavicle near its acromial extremity. The medial line and the linea mammalis, are convenient landmarks for indicating the space which the heart occupies transversely. The median line divides the heart, leaving about one-third on the right, and two-thirds on the left side. The left margin of the heart, in the male, extends to a point just within the nipple, which is situated on the fourth rib, near the junction of its rib with the cartilage. The apex is about three inches to the left of the median line, and about an inch within the linea mammalis. The right margin extends from half an inch to an inch beyond the sternum, on the right side.

Viewing the several portions of the heart in relation to the median line, on the right are situated the right auricle, and about a third of the right ventricle; on the left of this line are situated two-thirds of the right ventricle and the left auricle.

The relations of the heart to the adjacent organs are important with reference to the signs furnished by percussion, also by the other methods of exploration. At the base are the large arteries connected with the ventricles, viz., the aorta and pulmonary artery, which extend up beneath the sternum —the latter to the level of the upper margin of the second, and the former nearly as high as the first rib. The portion of the heart situated on the *right* of the median line is *covered* by the right lung. The lower border of the heart, to the left of the median line, lies on the diaphragm which separates it from the left lobe of the liver, and, towards the apex, from the stomach. The portion of the heart lying to the *left* of the median line, is only partially covered by the left lung—a part is in contact (the pericardium only intervening) with the thoracic walls.

The space on the chest within which the heart is not covered by lung, is called the *superficial cardiac region.*

The præcordial space within which the heart is covered by lung is called the deep *cardiac region.*

These names should be remembered, for they will frequently occur.

The boundaries of the *superficial cardiac region* are thus given: It is bounded on its sides by lung, and on the greater part of one side, viz., the lower, by the liver and stomach, with the diaphragm intervening. The portion of the heart's surface exposed, is an irregular quadrangle. This space may be embraced within a right angled triangle delineated as follows: The oblique line, or hypothenuse, is drawn by connecting a point at the centre of the sternum on a level with the junction of the fourth costal cartilage, with the point where the apex of the heart comes in contact with the thoracic walls, the latter being usually in the fifth intercostal space, about an inch within the linea mammalis, or about

three inches to the left of the median line. The median line extending from the same point on the sternum, and a line extending transversely from the point of the apex-beat to meet the median line, will form the two other sides of the triangle.

The limits to which the *deep cardiac region* extends have been already defined in giving the boundaries of the space which the heart occupies within the chest.

The dulness over the *superficial cardiac region* is more decided than over the *deep-seated cardiac region*, owing to the fact that it is not covered by lung. This dulness can be recognized by *light* percussion. It requires *forcible* percussion to mark out the dulness over the *deep cardiac region*.

[For full and minute directions to examine by percussion, consult Walshe or Flint on Diseases of the Heart.]

If the *dulness*, found on examination of a patient, exceeds the limits given above, we may conclude that some kind of enlargement exists. The heart, in proportion to its increase in volume, pushes aside the anterior border of the left lung, leaving a large portion of its anterior surface uncovered and in contact with the thoracic walls. The degree of dulness within the superficial cardiac region is greater than in health in proportion to the enlargement. Increased extent and degree of superficial dulness are signs of enlargement of the heart, provided the adjacent organs are healthy. The presence of phthisis, chronic pleurisy, enlargement of the liver, dilatation of the stomach, aneurism of the aorta, enlarged spleen, ascites, pregnancy, may cause difficulty in making a correct diagnosis by means of percussion.

The limits of this work will not permit us to go further into this subject. For full and exact knowledge relating to the physical diagnosis of abnormal conditions discernable by percussion, reference must be had to the works previously alluded to.

THE SOUNDS OF THE NORMAL HEART.

When the ear is applied over the cardiac region, during the natural movements of the heart, two successive sounds are heard, each pair of which corresponds with one pulsation; there is also an interval of silence between each recur-

rence, and the sound that immediately follows this interval is known as the *first* sound, the other as the *second.*

The *first* sound of the heart is caused by the contraction or *systole* of the ventricles, and is called the *systolic* sound. The *second* sound is caused by the dilation or *diastole* of the ventricles, and is called the *diastolic* sound.

The *first* sound is heard plain, over the *apex* of the heart, or where the apex-beat is felt.

The *second* sound is best heard just above the base of the heart, in the intercostal space between the second and third ribs, close to the sternum.

The *first* sound, over the apex, is longer, lower, and has a "blowing" quality.

The *second* sound, in the second intercostal space on either side, is shorter, more acute, and has a clicking or valvular quality.

In order to get a clear idea of the heart-sounds, the stethescope should be used. The bin-aural stethescope is considered superior to all others for this purpose.

If the *ear* is applied to the præcordia, the sounds from different sources are commingled, and they cannot be so well studied separately.

The *second* sound of the heart varies, as we study it on different sides of the sternum, in the space between the second and third ribs.

On the *right* side the sound is more acute, more abrupt, louder, and apparently nearer the ear, and is said to be caused by the movements of the semi-lunar valves of the *aorta.*

On the *left* side the sound is less acute, and emanates from the valves of the pulmonary artery, and due to their expansion succeeding the ventricular systole.

This *second* sound of the heart consists of a single element only — a *valvular* element — in this respect differing from the first sound.

The *first* sound of the heart, as heard over the apex of the organ, is a *mixed* sound. It is composed chiefly of two distinct elements. One of these elements consists of a clicking sound, emanating from the mitral and tricuspid valves; the other proceeds from the movements of the apex of the

heart against the thoracic walls. The latter is called the element of impulse, or the impulse-sound; the former, the valvular element, or valvular sound.

THE ABNORMAL SOUNDS OF THE HEART.

There are certain morbid sounds or murmurs of the heart which occur in disordered conditions of that organ. They mingle with, follow, or quite supersede the healthy sounds.

These "murmurs," as they are generally called, with one or two exceptions may be considered as modifications of the *bellows murmur*, or *bruit de souffle*.

This, in its purest form, is a smooth, blowing sound, named from its resemblance to that made by a pair of bellows. It may be single or double, soft or loud, of a low or high key; short, so as to merely prolong one of the natural sounds, or continuous, so as to fill up more or less completely the space between the impulses. Sometimes it wholly supersedes the healthy sound, and nothing is heard but one continuous bellows-murmur; but such cases are rare.

Not unfrequently it becomes, in various degrees, rough or broken; and attempts have been made to designate the modifications thus produced by the terms filing, rasping, sawing, etc. The *sawing* sound being a *double* sound, should only be applied to the double murmurs produced by the alternate motion of the heart. In some instances the murmur is of a musical or whistling character, and has been compared to the chirping of young birds.

The pure *bellows murmur* may exist without any organic disease of the heart. It may be produced artificially, by alterations in the diameter of one of the larger arteries, even in health, as by the pressure of the stethescope upon the artery. The most frequent cause of the sound is probably an abrupt contraction at one of the orifices, or in one of the tubes through which the blood passes. It will be readily understood that the fluid, as it emerges from the stricture, and spreads out to fill the larger space beyond it, breaks into currents, which set against the sides of the tube, and, being thence reflected, occasion vibrations which result in sound. Thus the sound may result from contraction of any of the

orifices of the heart, or the expansion of one of the great arteries immediately beyond them, and, in the former case, may be produced either by organic or by functional disease or spasmodic contraction. The *bellows murmur* is not always produced by changes in the heart and arteries. It may be produced by a *watery state of the blood*, such as occurs in chlorosis or anæmia. The liquid in these states being more movable, currents are more easily formed by whatever affects the regular movements of the blood. In such conditions, anything which excites the circulation will generate the murmur. It may also be induced by bleeding, and arises from any profuse hæmorrhage.

The *rough murmurs*, as they are called, to distinguish them from *smooth* murmurs, may be produced by *inequalities* in the surface over which the blood flows, especially in the orifices of the great vessels, produced by depositions of lymph, excrescences of various kinds, osseous or cartilagenous productions, etc. These rough sounds, like *rasping*, *filing*, and the like, are supposed to indicate organic disease in the valves or the valvular openings.

Another species of murmur is called the *regurgitant*. These regurgitant murmurs are caused by some defect in the valves—either loss of substance, irregular thickening, dilatation of the orifice, or something else which prevents their accurate closure, and thus allows a regurgitation of the blood. It may be supposed that in these cases the sound is ascribable not only to the irregularity given to its backward movement through the insufficient valve, but also in some measure to the conflict of the reverted with the regular current of blood; as, for example, when the blood of the contracting ventricle is sent through the insufficient auriculo ventricular valve against the current entering the auricle.

All these murmurs are heard most distinctly when the heart is in an excited condition. They are influenced by the less or greater force of the moving cause. The *systolic* ventricular murmurs are louder than the diastolic, because the former is caused by the more powerful contraction of the ventricles; the latter, on the feebler elastic pressure of the great arteries.

Roughness of sound is proportionate to irregularity in the

surface producing it, and it most frequently attends regurgitation.

The *tone* of the murmur depends somewhat on the depth at which the sound is generated.

By close examination, the following two important points can be ascertained:

I. *In which of the valvular orifices the murmur originated.*

II. *Whether it depends on obstructions, or upon deficiency of the valves, and consequent regurgitation.*

When the sound is loudest on the sternum immediately below the insertion of the third rib, and thence extends upwards for about two inches along the course of the great vessels, it may be considered as having its source in the *semi-lunar* valves.

If the sound be perceived most distinctly along the course of the ascending aorta, upon the right, it is probably seated in the *aortic* valves; if along the pulmonary artery, on the left, it is in the *pulmonic* valves.

When the murmur is most distinct over that part of the chest on which percussion is dull — that is, where the ventricles are in contact with the walls — it may be inferred that it is generated either in the *mitral* or *tricuspid* valve; in the former, when the point of greatest loudness is a little to the right of the left nipple, and an inch or so below it; in the latter, when the analagous point is on or near the sternum, in the same horizontal line.

There are other *morbid sounds*, resembling murmurs, which have nothing to do with the valves of the heart.

Among these are the *anæmic murmurs*, mentioned above. They do not follow the course of the large vessels so fully or frequently as do valvular murmurs. They occur only during the systole of the ventricles — are not generally heard below the left nipple, as they do not arise from regurgitation through the mitral valve. They are almost always accompanied by a smart, smacking impulse. They disappear during mental or physical quiet. They are always diminished, and generally disappear under appropriate medical treatment, which is not ordinarily the case with true valvular murmurs.

Venous murmurs (nun's murmur, top murmur,) are heard

in many young persons, in the anterior triangular space, in which the external jugular vein descends. It is a continuous murmur, and is generally more audible on the right than on the left side. This murmur disappears when the current of blood is interrupted by pressure upon the jugular vein, or by any position of the body in which the head lies lower than the thorax. It is heard loudest in an erect position, and during inspiration. It was thought to be connected with anæmia, but has been found as often in young and healthy persons.

Pericardial murmurs. The inner surface of the pericardium is normally smooth, and the heart moves within it without causing any sound. But when this surface becomes roughened in consequence of inflammation and exudation, we hear *friction-sound*, which may closely resemble an endocardial murmur. We can generally distinguish between these murmurs, for the *internal* murmurs correspond almost exactly to the rhythm and the natural sounds of the heart, whilst the *friction-sounds* seem to *follow* upon the movements of the heart. Should the friction-sound be short, we cannot distinguish it from an endocardial murmur.

There is another *friction-sound*, caused by a roughened condition of that portion of the *pleura* which covers the unattached portion of the pericardium. It is produced by the rubbing of this portion of the pleura against the lungs or thoracic walls. Being caused by the action of the heart, it exactly coincides with its rhythm, and cannot be distinguished from endocardial murmurs. The previous history of the disease and the result of appropriate treatment can only settle the question.

LECTURE III.

FUNCTIONAL DISORDERS OF THE HEART

Definition and various Forms of Disorder — Pathological Relations and Causes — Association with other Diseases — Symptoms, Physical Signs of — Diagnosis — Prognosis — Treatment — Cases.

GENTLEMEN: I propose to take up the Diseases of the Heart in the following order: (1) Functional. (2) Inflammatory. (3) Organic. This lecture will treat of *Functional Disorders of the Heart.*

A purely functional disorder of the heart is any disturbed action occurring independently of either inflammatory or organic affection. These affections may be attended by more or less functional disorder, but there are many cases where the latter are unattended by any lesion or inflammation.

In most cases, the disturbed action of the heart is evidently due to morbid conditions seated elsewhere, but it may be symptomatic of either blood-changes, or affections of the nervous system, or of both.

It must be borne in mind that disordered function of the heart, in cases of inflammatory or organic affections, involves the same morbid conditions which often exist independently of these affections.

The subject of functional disorder of the heart is of great practical importance, on account of the frequency of its occurrence, the anxiety which it occasions, and the liability of confounding it with organic disease.

The majority of persons who complain of symptoms referable to the heart, suffer from functional disease only. But the discrimination of functional from organic affections can only be made by one who is thoroughly acquainted with the subject. The great importance of a correct diagnosis is obvious, when we consider that structural lesions involve more or less danger, while functional disorder, although very distressing, very rarely, if ever, proves serious.

There are several varieties of functional disorder. In the mildest form the action of the heart is simply increased by transient exciting causes, such as mental emotions, unusual exertions, etc., but this excited action is only transient.

Persisting inordinate action is another form. The heart may act with regular rhythm, but with abnormal rapidity and force, not greatly influenced by exciting causes; and this action may continue for weeks and months. The pulse, in such cases, ranges from 120 to 130 per minute, and the patient is in a state of constant anxiety, fearing organic heart disease.

Paroxysms of irregular and tumultuous action is another form of this disorder. Such paroxysms often occur without any obvious exciting cause, and the patient is attacked suddenly with violent beating of the heart, with disturbed rhythm. A feeling of impending death is experienced, with great terror and anxiety, which increases the intensity of the paroxysm. The slightest motion increases the anxiety and palpitation. (*Digitalis.*)

The attacks may occur at short intervals, or only once in a few weeks; they may last but a few moments, or several hours. Such cases are frequently met with in hysterical women, and are accompanied by various attendant symptoms. Boullard calls this affection an "insanity of the heart," but it has appeared to me to act more like a choreic affection, such as we observe in muscles elsewhere.

Another species of paroxysm is *irregularity* and *intermissions, without increased force of the heart's action;* on the contrary, the action of the heart may be quite feeble. Such paroxysms inspire great terror. The patient feels as if the slightest movement would cause death, from stoppage of the heart's motion, or from syncope. (*Gelseminum.*)

It must be remembered that some cases of mere *intermittency* are congenital, and are of no importance as a symptom.

In other cases the pulse may intermit, but not the heart's action. This is termed a false intermission. The force of the ventricular contraction is not sufficient to produce a radical pulsation.

CAUSES AND PATHOLOGICAL RELATIONS OF FUNCTIONAL DISORDER OF THE HEART.

These may be enumerated as follows: plethora, anæmia, derangement of the nervous system, dyspepsia, and the gouty diathesis.

Plethora is that condition in which the blood is abnormally rich in red globules, and, perhaps, in excess as regards quantity. The heart becomes overtaxed and overstimulated, and becomes morbidly irritable. There is much violence of action without much disturbance of rythm. Palpitation may be the first symptom that awakens the anxiety of the patient, and concentrates his attention on the heart. He becomes fearful of organic disease, and taxes the patience of his medical attendant to a high degree. Those who suffer most from this affection are men who leave the farm or workshop, and men of previously active business pursuits, who change their mode of life and become luxurious, indolent, or lead sedentary lives. Women who tend to obesity and live much indoors are liable to this form of heart disorder.

Anæmia, or an opposite condition to the above, is more frequently met with, and rarely occurs without more or less disturbance of the heart's action. Women are more subject to this variety than men. Anæmia being produced by excessive loss of blood, or of any of the fluids of the body, the first cause may generally be located in some particular organ or tissue. It must be borne in mind that the heart disorder is not always proportionate to the anæmia. It may be slight in cases of marked anæmia, and severe when that condition is hardly appreciable.

With the anæmia, besides the functional heart disorder, we shall find coldness of the extremities, headache, neuralgia, melancholy, irritability of temper, etc. Anæmic patients, with heart symptoms, live in constant dread of organic disease, and fear of fatal results. If the physician trusts altogether to symptomatic phenomena, he may have the same fear of serious results in his patient, for in these cases palpitation is excited by the slightest exertion; dyspnœa is experienced, the countenance is morbid, and occasionally

dropsy sets in, which may be mistaken for the dropsy caused by organic disease.

Derangements of the nervous system may be a cause of functional disorder of the heart, without the presence of anæmia. Cases of hysterical palpitation come under this head, for hysteria often occurs without anæmia, but with plethora.

A condition of the nervous system favorable to functional disorder is said to be caused by masturbation and venereal excesses. Uterine disorders are a prolific cause. The excessive use of tobacco, green tea, and coffee often induce a condition giving rise to functional disorder of the heart.

Whatever may be the causes of this condition, mental depression is a constant attendant (in marked contrast to chronic pulmonary affection). The patient persists in believing that he has organic disease, in spite of our most earnest assurances. He watches the action of the heart with constant anxiety, and habitually counts his pulse, and feels for the beating of the heart, and lives in such a morbid state, mentally, that the condition of the heart is actually aggravated by his constant dread and apprehension.

Dyspepsia, in its various forms, tends directly to cause this disorder, but as many dyspeptic ailments proceed from derangement of the nervous system—and this often induced by mental distress or anxiety—it is often difficult to separate this cause from those gastric affections proceeding from indigestion or hepatic derangement.

Dyspeptic patients with heart disorder are equally prone to magnify it into a dangerous complaint. They watch the pulse and the beating of the heart, and are in dread of sudden death, such as they have heard of in organic disease. It is notorious that this morbid watching for heart-symptoms, and the anxious expectations of finding heart disease, is actually sufficient, in some cases, to produce the functional variety. The presence of gas in the stomach, even when dyspeptic symptoms are not present, often causes severe attacks of palpitation. In such cases, the expulsion of a quantity of wind by belching often puts an end to the distressing paroxysm.

The gouty diathesis gives a liability to functional derangement of the heart's action. Attacks of palpitation occur in

such persons before the joints are affected, and cease when tumefaction is present. The presence of an undue quantity of *lithic acid* in the blood is supposed to be a cause—acting as an irritant to the nerves which control cardiac action.

Other causes of functional disorders have been noticed by clinical observers. It occurs during convalescence from fevers. Deformities of the chest seem to favor it. Young persons whose growth is rapid are liable to it. Excess in muscular exercise induces it. Soldiers in the late civil war were affected with it, probably caused by the excitement and muscular exhaustion incident to their life.

FROM WHENCE COMES CARDIAC INNERVATION?

This is an interesting question, both in its pathological and therapeutic relations. Barthez* says we must make a distinction between the *radical* and the *acting* forces governing the heart. The former may be nearly exhausted, while the latter are in full play; and, *vice versa*, the latter may be but slightly manifested, while the former are powerful. The amount of *radical* forces represents a person's capacity of vital resistance to disease and fatigue. The *acting* forces have their origin in the radical. In cases of functional disorder we have hyperæsthesia from debility, or a *morbid* stimulus may be reflected from the nervous centres on the cardiac nerves.

According to Bezold, the nervous centre of the cardiac movements furnishing three-fourths of the entire propulsive power of the heart, occupies the *cervical region of the cord, including the medulla oblongata, and extends as low as the fourth dorsal vertebra.* Its fibres run through the cervical spinal cord, and pass out between the seventh cervical and fifth dorsal vertebra, probably passing through the lower cervical and upper dorsal sympathetic ganglia, and proceeding to the heart.

The innervation of the heart is derived, in part, from the ganglionic or sympathetic system, and partly from the pneumogastric nerves. For its *active force* the heart is dependent on the cardiac ganglions and the plexus of nerves

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* Traits de Therapeut., vol. 1, p. 43, par Trousseau and Pidoux.

with which they are connected. The function of the pneumogastrics is to *regulate its action*. The latter presides especially over the rhythm of the heart's movements. Morbific agencies giving rise to functional disorder may affect separately these two sources of the innervation of the heart. Most of the causes of functional disorder probably act primarily upon the nervous centres, but in some cases, as when the disorder depends on dyspepsia, or uterine irritation, the morbid influence is transmitted to the nervous centre, and *reflected* upon the heart. Very many cases of functional disorder of the heart are doubtless reflex in character. If we could decide, by accurate investigation, the particular nerves upon which medicines act pathogenetically, our knowledge of the curative powers of remedies would be much more certain.

PHYSICAL SIGNS OF FUNCTIONAL DISORDER.

Physical exploration by means of auscultation, percussion, and palpation, is of immense value in functional disorder of the heart, as showing the *absence* of the signs of inflammatory and organic affections. The information which it affords is not less positive than if there were certain signs peculiar to functional disorder.

In our examination of the heart in cases of supposed functional disorder, we have to decide, *first*, as to the absence of abnormal phenomena denoting structural changes; and *second*, as to the presence of the normal phenomena denoting soundness of the organ.

By *percussion* we can ascertain that the heart is not enlarged, and, if not enlarged, that the disorder is quite certain to be functional. But we cannot, on the other hand, decide that the disorder is *not* functional because the heart *is* enlarged, for functional disorder may supervene upon, or coincide with enlargement.

Palpation enables us to ascertain the *force* of the heart's action. The movements and the irregular action are readily appreciated by the hand. We can discriminate between the *increased* and disturbed action due to morbid excitement, and the augmented *power* due to hypertrophy. The impulse in

hypertrophy denotes *strength* rather than *force*; it is not quick and violent, but sluggish and strong; it does not give the sensation of a shock or blow, but it causes a gradual and strong heaving of the præcordia.

Palpation also shows that in functional disorder not attended by structural disease, the point of apex-beat is in its normal situation; not elevated, as in pericarditis with effusion, nor lowered and carried to the left, as in cases of enlargement of the left ventricle.

Auscultation is important in two ways, *first*, by showing the *absence* of abnormal sounds indicating valvular lesions; *second*, showing that the natural sounds preserve their essential characters and normal relations to each other.

Endocordial murmurs are very rarely heard, if ever, in purely functional disorder. A venous murmur, or hum, in the veins of the neck may be heard in persons in health, and the anæmic murmur may be diagnosed by the general condition of the patient. Aside from these two murmurs, it is not of practical importance whether a murmur be organic or inorganic, so far as relates to the treatment of functional disorder. Valvular lesions do not cause notable disturbance of the heart's action prior to enlargement. If therefore enlargement is not present, the disturbed action of the heart may be considered as functional.

It must be borne in mind that all the normal heart sounds are intensified by the increased action present in functional disorder. So distinct do they become, that they may be perceived by the patient, especially at night. But if their sounds are only intensified, and not changed, we may know that functional disorder only exists.

DIAGNOSIS.

In order to make a correct diagnosis, we must *first* determine whether organic disease be or be not present; *second*, if organic disease be present, to determine whether superadded functional disorder be not the source of more or less of the symptoms referable to the heart.

It is in this case as in tubercular phthisis, that we can sometimes decide from the *mental* condition of the patient.

It is well known that persons affected with tuberculosis are cheerful, and do not appreciate the gravity of the disease, while in those pulmonary disorders not dangerous they are despondent and foreboding.

In functional cardiac disorder, the patient is very anxious and apprehensive, while in purely organic disease no such degree of anxiety is manifested; on the contrary, they are often apathetic on the subject.

Again, the same or a greater amount of disturbance, when present in organic disease of the heart, causes much less anxiety than when arising from functional disorder.

The paroxysmal character of functional disorder is quite in contrast with the continued persistency of the symptoms of organic lesions.

In functional disorder active exercise does not generally aggravate the symptoms, it sometimes alleviates them, while in organic disease the contrary obtains.

There are certain symptomatic conditions belonging especially to organic disease, that are absent in pure functional disorder. Among these are general dropsy, lividity, hæmoptysis, paralysis from embolism. They may coexist with functional disorder, but are not caused by it.

Cardiac disturbance is probably functional if it be connected with plethora, anæmia, derangement of the nervous system from excessive venery, mental anxiety, the abuse of tobacco, tea, coffee, or with gout.

Organic disease, on the other hand, in the majority of cases originates in acute rheumatism. If the patient has never had the latter affection, the probability is that the disorder is functional.

Functional disorder occurs especially in the young, between puberty and middle life.

Organic disease is oftener present in persons past the meridian.

Functional disorder is oftener present in females than males, while the reverse occurs in organic disease.

Functional disorder is worse at night; organic disease during the day.

We should not, however, venture an opinion as to the presence or absence of functional disorder, until we have

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made a physical examination. This, and this only, should decide us in forming a diagnosis.

PROGNOSIS.

The prognosis in cases of uncomplicated functional disorder is always favorable. The opinion that it may lead to organic lesions has been disproved. We may safely assure our patients that if a recovery does not occur, no organic disease need be apprehended.

TREATMENT OF FUNCTIONAL DISORDER OF THE HEART.

The therapeutics of functional disorder of the heart include:

I. Relief of disturbed action when present, or *palliative* measures.

II. Removal of the morbid irritability of the heart, or the causes of such irritability. These are the true *curative* measures

Palliative measures are those which will allay any temporary excitement or disturbed action.

The mildest form of the disorder, when it arises from a fright, or undue exercise, usually need only rest of mind and body to allay it. A single dose of *aconite* may be of service.

For the attacks of palpitation, irregular and intermitting action, weakness or syncope, the following remedies will be found appropriate:

For paroxysms of palpitation from physical excitement, mental emotion, etc., a single dose of *aconite* will suffice if it has been caused by fright; *coffea* if from excessive joy; *ignatia* if from sudden grief; and *scutellaria* if from inordinate excitement of other kinds.

For paroxysms of tumultuous and irregular beating of the heart, with *violent* impulse, the chief remedy is *veratrum viride*, in doses of one drop of the tincture every hour, or oftener; a few doses will quiet the excitement. Such paroxysms usually occur in plethoric subjects. In similar cases *cactus* is often indicated, also *aconite*, *arsenicum*, *belladonna*, *cocculus*, *lachesis*, *naja*, and *spigelia*.

For paroxysms characterized by irregularity and inter-

missions, with *feeble* action or impulse, another class of remedies is indicated, namely: *digitalis*, *cannabis ind.*, *laurocerasus*, *acidum hydrocyanicum*, *arsenicum*, *veratrum album*, and *aconite*.

Paroxysms of tremulous agitation of the heart call for nearly the same remedies, but the attacks are generally of such brief duration, that there is no time for the administration of medicines.

Hysterical palpitations or disturbed action, require the use of *ambra*, *assafœtida*, *camphor*, *castoreum*, *crocus*, *ignatia*, *lilium*, *sumbul*, *scutellaria*, and *valeriana*.

In actual cardiac syncope, the use of active stimulation is necessary. Brandy, or any alcholic liquor may be used, or *camphor*, *xanthoxylum* and *ammonia*, aided by the mustard foot bath. The recumbent posture is absolutely necessary until the attack is over.

[For special or characteristic indications for the selection of remedies consult the symptomatology given in this work.]

RADICAL OR CURATIVE TREATMENT.

Plethora should be treated by means of appropriate diet namely: the abstinence from rich and stimulating food coffee, pastry, and the avoidance of a sedentary life. Small meals and a large amount of active exercise are the principal curative agents.

The administration of *veratrum viride* in doses of five drops of the first decimal dilution three times a day, will aid in effecting a removal of the plethoric condition. Equally efficacious is the *bromide of ammonium* in five or ten grain doses of the first decimal trituration, taken after each meal.

Anæmia should be met by such remedies as will increase the proportion of red globules in the blood, and the use of such articles of diet as will bring about the same result. Active exercise in the open air, and a residence in non-malarious localities, should be advised.

Ferrum, in some form, is here the principal remedy; but it must be borne in mind that *iron* is *not* the remedy in all cases of anæmia. It will not remove anæmia caused by distressing emotions, nor the anæmia growing out of some

morbid dyscrasia. It is only useful in cases arising from some fault in assimilation or abnormal condition of the vegetative system. Various preparations of *iron* have been found useful. *Ferrum met.* in the lowest triturations is generally useful; but if this does not have the desired result, and *iron* seems to be strongly indicated, select the *lactate of iron, muriated tincture of iron, phosphate of iron, iodide of iron,* or the *citrate of iron and strychnia.*

The hypophosphites of lime, soda, or potassa, phosphoric, or *hypophosphoric acid,* act promptly if the anæmia arise from nervous prostration or prolonged nervous excitement.

China is indispensable if the anæmia is the result of hæmorrhages, or loss of any of the vital secretions of the body. *Helonias, hydrastis, phosphoric acid,* and *arsenicum* are indicated in similar conditions.

Cuprum is, according to Grauvogl, superior to iron in many cases of anæmia.

Nux vomica, ignatia, and *strychnia* are indispensable in certain anæmic conditions, when the blood is impoverished from deficient vitality of the nervous centres.

When derangement of the nervous system causes functional heart-disorder, *nux, ignatia, secale, phosphorus, cuprum, digitalis, phosphoric acid,* and similarly acting medicines are to be used. The *bromide of potassa* and *zinc* will be found useful in many cases.

When the cardiac irritation is *reflex,* we must select:

For *gastric disturbance — nux vomica, pulsatilla, ignatia, collinsonia, lycopodium, iris ver., hydrastis,* etc.

Collinsonia is very highly recommended by many prominent physicians of the eclectic school of medicine, as an excellent remedy in purely functional disorder of the heart, when its action is *persistently rapid, but weak,* or when there is excessive *action* with deficient *force.* It has been given successfully in doses of 5 to 15 drops of the tincture several times a day. The pathological conditions to which it is homœopathic cannot be clearly defined because the provings do not yet indicate its specific action on the heart. But from its known curative action in cough, hœmoptysis, hæmorrhoids, and constipation, we may consider its action on the heart as

reflex. My experience confirms the recommendation of its use in some cases of functional disorder.

For *uterine disturbance—cimicifuga, pulsatilla, platina, lilium, sepia, gelseminum, nux moschata, sanguinaria*, etc.

The following is one of the many notable cases of functional disorder of the heart resulting from uterine disease, which have come under my observation:

CASE.—A lady, mother of two children, had suffered for several years from retroversion, abrasion of the os uteri, and a great variety of anomalous pelvic pains peculiar to such cases. About a year ago the uterus was replaced, and a ring pessary inserted, which kept the uterus in normal position, and soon after the leucorrhœa and uterine pains disappeared. But she soon began to complain of rapid and persisting beating of the heart—worse at the menstrual period—which increased to such a degree that I was consulted. Neither auscultation nor percussion revealed anything abnormal, except an increased clearness of the sounds of the heart. The force of the heart's action was decidedly increased. The pulse was generally regular—120 to 130—but sometimes irregular and intermitting. The menses, heretofore normal in amount, became scanty, and a condition of prostration set in, accompanied by emaciation. All the cardiac remedies in our materia medica were consulted and tried, but without other than palliative benefit. (*Nux moschata* helped her most.) The bromide of potassa and hydrate of chloral gave no permanent relief. A few weeks ago she was attacked by the prevailing influenza, and came near having pneumonia, but it was arrested by the free use of *veratrum vir.* A severe cough, which called for *sanguinaria*, led me to give that remedy. On the day after, she said, "Doctor, something has stopped my heart for the first time in a year." To my surprise, I found it beating regularly, quietly, at 72 per minute. Did the *sanguinaria* cause this curative action? I do not know. Her menses came on the day I gave the *sanguinaria*, and more profuse than usual, and she now began to complain of her old uterine symptoms. On examination the uterus was found retroverted—the ring pessary appearing too small to support it in proper position—and the presence of cervical inflammation was detected.

A larger ring was introduced, *lilium* and *sepia* given, but the heart still beats normally. I think the irritation was transferred or reflected from the uterus to the heart and has now returned to the former organ. What part the sanguinaria played in this case I do not know, but imagine it may have assisted in the transferrence.

Among the palliative remedies in this cardiac disorder, the *chloral hydrate* bids fair to become useful. Physicians of other schools speak highly of it in such cases. Its well-known power over nervous aberrations, whether local or reflex, appears to recommend it as a valuable agent. One of my patients, whose heart kept her awake, night after night, for months, got no sleep from any remedy until she took the chloral — 15 grains at bedtime. Under this remedy she improved decidedly in strength and appetite, and specific remedies appeared to have a better and more lasting effect in bringing about a cure.

Nux moschata has had a reputation for centuries in heart disorders of a nervous character. The symptoms given in Dr. Hering's very complete pathogenesis, prove it to have a decided influence on that organ. Among the most prominent symptoms are—*quivering*, *trembling*, *fluttering*, and *violent palpitation*, *labored beating of the heart*,—"*a fearful embarrassment.*" It is asserted to be curative in cases arising from fear, fright, grief, stoppage of urine, uterine troubles, menstrual difficulties. I do not hesitate to advise it in cardiac *debility*, with the symptoms above enumerated, especially in delicate, nervous women given to fainting, or sensitive to the slightest emotion, and when the cardiac irritation alternates with uterine or vesical disorder, or even gastric troubles. Give the 3rd or 6th trituration.

Prunus virginiana (wild cherry) has long held a high reputation in abnormal conditions of the heart characterised by *irregular*, *intermitting*, *and feeble action*. It will be found most useful when the disorder is purely functional, but it has been used with excellent results as a palliative in structural disease. The usual method of administration is in the form of cold infusion. One ounce of the inner bark (*fresh*, if procurable)

in a quart of cold water. After standing six hours, it may be prescribed in wine-glassful doses every three or four hours, until there is a decided improvement. It is a safe and simple remedy, giving tone to the general system, and improving the condition of the circulation. It is a feeble analogue of *digitalis*.

*Lycopus virginicus** has some reputation for conditions similar to those for which *prunus* is recommended, but from the testimony adduced for it I think it resembles *aconite* rather than *digitalis*, and is better indicated where the pulse and heart's action is rapid, but rather hard, with or without irregularity. From some of the symptoms of the proving, as well as the results of clinical experience, it promises to be useful in that disorder known as "exophthalmus," — "Basedow's Disease" — "Grave's disease," etc. According to Flint, functional disorder may end in this condition. The *lycopus* may have the power of warding off such result. Prescribe it in lowest dilutions or mother tincture.

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*New Remedies, p. 705.

LECTURE IV.

ANGINA PECTORIS.

Nature of the Disease — Symptoms — Pathology — Pathological Relations — Its Frequency — Prognosis — Cause of sudden death in — Diagnosis — Treatment.

GENTLEMEN: Of all affections of the heart this is the most painful and distressing. While some authorities — among whom is Dr. Watson — would place this disorder among the organic diseases, the majority consider it a functional disease. Watson thinks it is not a neuralgia, because the paroxysms are excited by bodily exertion and mental emotion, and because it is so frequently and suddenly fatal. But Dr. C. Handfield Jones disposes of this by citing the commonly observed fact that many of the neuralgiæ are excited and aggravated by similar causes. Dr. Jones, after summing up the opinions of various authors, expresses himself in these words, "It is thus invariably a neuralgia, whose sole and constant seat is in the cardiac plexus." *

This affection is characterized by paroxysms of intense pain, emanating from the region of the heart, and extending in various directions, often into the left shoulder and down the arm, accompanied by indescribable anguish, a sense of suffocation, and a feeling of impending death. The pain radiates into both sides of the chest, into the back, upper extremities—generally the left—and sometimes extends into the lower extremities. The pain in the upper extremity does not always extend to the hand, sometimes it ends at the shoulder, at other times in the elbow, and the pain is occasionally felt only in the forearm. It commonly seems to follow the course of the nerves, and is felt all over the affected extremity, even to the ends of the fingers.

The pain is attended by a feeling of numbness, or as if the

* On Nervous Disorders, p. 212.

limb was paralyzed. A rare symptom is pain and numbness in the testicles. Hyperæsthesia, or tenderness, where the pain is felt, has been observed.

This is one of the affections that are purely paroxysmal, a strong proof of its neuralgic nature. The patient is seized suddenly, often during motion, as walking up-hill, or against a strong wind, or when quickly turning in bed.

From the first instant of attack all motion seems impossible. He seizes hold of some firm support, or fixes himself in some way immovable, until the paroxysm passes off.

Besides the pain, the feeling of suffocation alarms the patient, and he feels as if death was impending. Dyspnœa is not always present, but the breathing is often suspended for an instant, or restrained by an act of the will, for fear of increasing the pain, but the *ability* to expand the chest and breathe regularly is not impaired. Speaking is often impossible, or difficult, as it seems to aggravate the pain.

Palpitation is often present; the action of the heart, in some instances, intermitting and irregular; the pulse strong or feeble, and sometimes *very slow*. The countenance is pale and expresses terror, anxiety, and distress; a death-like complexion and haggard features suddenly taking the place of an appearance of health. Lividity is sometimes observed. The surface is cold and bathed in cold sweat. The faculties of the mind remain unaffected or nearly so. After an attack a sense of prostration is present, and sometimes, as after other nervous attacks, a free secretion of pale limpid urine.

The paroxysms differ in the frequency of their occurrence, duration, severity, etc.

They may recur every few hours, days, or weeks, and often years may elapse between them. They are sometimes very mild at first, and afterwards increase in severity; or the first may be very severe. They may last for a few moments or seconds, or continue several hours. They will often subside as suddenly as they commenced; at other times the relief is gradual.

You must not get the idea that they only occur after some physical or mental excitement, for they often occur at night, during sleep. I have known persons who were thus affected, rendered so fearful of going to sleep as to make life almost

insupportable. In one case a fearful dream seemed to the patient to be the exciting cause.

You will naturally inquire what is the *pathological character* of this affection, also its pathological relations. As I have said, I believe the affection is generally a form of *neuralgia.* The character of the pain proves this. It has been ascribed to *spasm*, but a spasm of the heart, lasting as long as an ordinary paroxysm of angina, would destroy life; besides, the heart's action is seldom, if ever, arrested.

The pathological *relations* of angina are interesting. Flint says, "It involves, in a large proportion of cases, the existence of some organic affection of the heart and aorta," and adds that the lesions found "do not agree invariably in any appreciable morbid alterations." Valvular lesions may be present or wanting. Calcification of the coronary arteries is sometimes present. Fatty degeneration has been observed. It has been asserted that a "weakened heart" is essential to the presence of the disorder, but this theory is disputed by both Flint and Jones. While I do not believe that a *weak* heart is a necessary condition, it is more than probable that a condition is often present which is similar to *myalgia* elsewhere in the body. In other words, cardiac myalgia may simulate, or coexist with, angina.

As before remarked, angina pectoris is a very rare affection. In 338 cases of organic disease of the heart, Flint found it to exist in 15 only. That it occurs more frequently *with* than without organic disease seems proven.

The *causes* of this disorder are at best obscure. It has been supposed to arise from the rheumatic or gouty diathesis, but this supposition is not tenable. Nor can it be said to arise from dyspepsia. Trousseau considers angina a form of epilepsy, but this seems to me only a fanciful idea.

It occurs much oftener in males than in females, and in the majority of cases occurs after the age of fifty. But cases have been observed in youth, and even in infancy.

PROGNOSIS.

The *prognosis* will depend largely on the condition of the heart. If that organ, or the aorta, is in a state of structural

disease, the prognosis is far more unfavorable than if the disorder is purely functional in character. If organic disease is present, you cannot assure the patient of exemption from their recurrence, while, if not connected with lesions, years may elapse before another paroxysm occurs.

Paroxysms of angina sometimes cause sudden death. In such instances, "the action of the heart is arrested by a morbid agency affecting it through the pneumogastric nerves, in the manner in which irritation of these nerves, or the electrical currents, produces this effect in experimental observations." (Flint.)

The danger is in proportion as the action of the heart is *feeble, irregular, or retarded during the* paroxysm. But if the action of the heart be but little, or not at all disturbed during the paroxysm, there will be but small danger of sudden death. Sudden death will oftener occur when organic disease is present, than when the disorder is purely functional. Even if organic disease is present, judicious homœopathic treatment often *cures*, and generally cures the purely neuralgic.

The *diagnosis* of this disease is generally easy. I do not see how the paroxysms can be confounded with attacks of dyspnœa, or so-called cardiac asthma, for with the latter *motion* is not incompatible, *pain* is rarely present, they do not occur *abruptly*, and there is not the same fear of impending death.

There is a *pseudo* angina occurring in hysterical, anæmic, or dyspeptic persons. The misnamed *cardialgia* may sometimes simulate angina, and I have known the *pain under the left breast*, occurring in women, to be so severe as to resemble that disorder. Intercostal neuralgia and myalgia may closely imitate it; but the *tenderness on pressure*, which is so diagnostic of the former, is rarely present in angina pectoris.

TREATMENT.

The treatment of this distressing disorder embraces:

1. Remedies which will diminish the severity and shorten the duration of the paroxysms.

2. Such treatment in the intervals as will postpone or prevent the recurrence of the paroxysms.

It is a difficult matter, as you will find, to treat a single paroxysm. It is generally of such short duration that no remedy can be selected and given before the brief "reign of terror" is over.

But in those instances in which the paroxysm is of longer duration, you should do your best to allay the terrible distress. A firm and reliant demeanor on your part—assuring the patient that he will *not* die—is of much service, for the deadly fear, added to the pain, may be a source of danger to the patient. There is some reliable testimony that a dose of *arsenicum*, 30th, has shortened the paroxysm. The same has been asserted of *lachesis*, 30th.

Certainly these remedies, if any, will act with sufficient rapidity, and are generally indicated in the severer forms.

If the action of the heart is very irregular and feeble, and there is a tendency to, or actual fainting, you should resort to the diffusible stimulants, such as brandy, or any kind of spirits which you can immediately procure, or, what is sometimes better, *ammonium carb.*, a few grains, dissolved in milk and water. A prompt resort to stimulants may save the patient's life, and ward off sudden and fatal syncope and cardiac paralysis.

If, however, the tendency to faint continues, and the pulse is very feeble, slow, irregular, or intermitting, *digitalis* is the appropriate remedy, and should be given in doses of 5 or 10 drops of the first dilution, repeated every 15 minutes. Watch the pulse, and suspend the medicine so soon as it becomes normal in force and frequency. *Digitaline*, 3rd trituration, may be substituted for the tincture.

If, with the general prostration, the skin becomes suddenly very cold and clammy, and cramps of the extremities set in, give *veratrum album* in the 6th dilution, frequently repeated.

If the *pain* is so severe as to predominate over all the other symptoms, and the action of the heart is not notably depressed, you may resort to the inhalation of *ether*. In a case which occurred in my practice several years ago, ether always gave relief in a few minutes. *Chloroform* may be used if more readily obtainable. It has one advantage, that

it acts more quickly, but it should be used with extreme caution. If half a drachm or a drachm does not give relief it should not be tried further. The *hydrate of chloral* acts very quickly, and a dose of ten or fifteen grains may prove a safe and efficient palliative remedy, used for the same conditions as ether and chloroform. Never give *opium*, or any of its alkaloids; they do not act quickly enough to palliate, and are useless as curative agents.

It has been found that *electrization* of the skin in the præcordial region is remarkably effective, both in arresting the paroxysms and postponing their occurrence. It is probable that with the great advancements made in electro-therapeutics, some method of application will be discovered that will result in a more certain curative treatment than we now possess.

Swallowing pieces of ice has been found an effective measure by Romberg. The application of mustard over the region of the heart may be of benefit. Dry cupping and the hot foot-bath should not be forgotten.

You should never be at a loss for expedients in the treatment of such disorders. Anxious friends are too impatient to wait until you have tried to question the sufferer, for every moment seems an hour to both, and unless you do something very quickly, their criticisms will be anything but complimentary. Not only should you be quick to act, but you should inform the attendants just what to do if the paroxysms return, and supply them with the appropriate remedy for such emergencies. It is seldom that a physician can be procured before the paroxysm has passed; for this reason it is your duty to anticipate the treatment. I will add that you will find it difficult to decide whether your treatment has really mitigated or shortened the paroxysms, for they vary so much as to intensity and duration. Finally, you must caution them against exciting causes, namely: strong mental excitement, violent muscular exercise, excesses in eating and drinking, walking against the wind, or climbing heights.

For the radical treatment of angina pectoris the best remedies are *arsenicum*, *digitalis*, *lachesis*, *naja*, *rhus*, *aconite*, *spigela*, *cimicifuga*, and *phytolacca*.

Arsenicum is probably the most reliable remedy for the eradication of the disorder. Hartman says, "Not only the actual paroxysms, but the disease, generally finds in arsenicum its appropriate remedy, provided the disorder is not complicated with structural changes of the heart and the large arteries, or other extensive disorganizations. It is indicated if the patient can only breathe very gently, with his chest stooping forward, and if the least motion causes a complete loss of breath; if oppression and stitches in the præcordial region are associated with anxiety and a fainting sort of weakness; if the breath gives out even while the patient is getting out of bed, and it takes him a long time to recover his breath; or if the paroxysm is excited by a simple change of position in bed." To these indications I will add, that *arsenicum* is especially indicated in angina with regularly recurring paroxysms, as sometimes occurs in malarious districts. In these cases, if the 30th does not prevent the recurrence of the paroxysms, use the lower dilutions. The dose should be repeated two or three times a day.

Digitalis and *digitaline* come next in importance. Baehr asserts that he cured a case with digitaline, 2nd and 3rd trituration, "not very often repeated." The symptoms and therapeutic range of the drug correspond with the disease, whether it be a pure neurosis or accompanying organic disease of the heart. In cases of angina pectoris indicating *digitalis*, abnormal action and a sense of oppression, with tendency of syncope, are predominant. The pulsations are irregular and feeble, or spasmodic, and cause anguish and pains under the sternum and below the ribs of the right side. The pain extends to the head and left arm. Vertigo and fainting, and feeble, irregular pulse are generally present.

I advise you to use the 1st dilution, or a few drops of the tincture of *digitatis*, in a half-glass of water, and repeat the dose as often as every six hours between the paroxysms. If you use *digitalin* use the *pure* alkaloid (not Keith's or any

other inefficient article), in the 1st centesimal or the 3rd decimal trituration.

You will find *lachesis* and *naja* useful when the pain and dyspnœa are concomitants of organic disease of the heart, and are attended by irritation of the glosso-pharyngeal nerves, causing distressing sensation of choking, constriction, or "rising" in the throat, and inability to speak. Use the 200th, and repeat not oftener than every 12 hours.

Aconite will prove an excellent remedy in your hands if your cases are marked by intense anxiety, fear of death, coldness, and cold sweat, feeble pulse, and intense pain in all directions, and general or local numbness and tingling. It is indicated in pure neuralgic cases, and should be used in the lower dilutions.

Spigelia has been used with good results, when there are severe stabbing stitches in the heart at every beat; pain and palpitation, aggravated by bending forward, touching the stomach, lifting the arms, or any other motion. It is useful in the purely neuralgic, and also cases of organic disease. The 6th dilution is to be preferred.

Rhus tox. is indicated in patients of a rheumatic diathesis —when the symptoms occur with or without organic disease. The characteristic indications for its use are, *stitches in the heart*, with painful lameness and stiffness of the whole body and extremities, and *pain extending down the left arm.* A case having these symptoms, also "hypertrophy with dilatation, paleness, and weakness; pulse soft, slow—48 per minute; coldness and numbness of left arm; pain worse every morning at 4 o'clock; a faint, fluttering sensation in stomach and left chest; gurgling in region of heart; soreness throughout left side; lying on left side brings on severe palpitation and pain in region of the heart," is reported as cured by the 200th of this remedy.

Phytolacca will be indicated in those cases where the pain extends to the *right* arm.

I once cured a case with *cimicifuga*,* 1st dil. The pains were sharp, lancinating, and extended all over the left chest,

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* See New Remedies, I 234.

down the left arm, and into the back, with dyspnæa, unconsciousness, etc.

If the remedies I have mentioned fail to cure, do not be discouraged, but try the *valerianate of zinc*, *laurocerasus*, *cuprum*, *crotalus*, *arnica*, and *cactus*, which last may prove to be an excellent remedy in this disorder, when its peculiar characteristic symptoms are present.*

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* See New Remedies.

PART II.

INFLAMMATORY AFFECTIONS OF THE HEART.

LECTURE V.

GENTLEMEN: I shall call your attention in this and following lectures to the

INFLAMMATORY AFFECTIONS OF THE HEART.

Inflammation of the heart may affect one or more of the structures which compose that organ. The investing serous membrane may be alone inflamed, constituting the disease known as *pericarditis*. When the membrane lining the cavities, or the endocardium, is the seat of inflammation, the affection is called *endocarditis*. Inflammation of the muscular tissue, or substance of the heart, is designated *myocarditis* or *carditis*.

Although these different inflammatory affections may exist each independent of the others, they are often associated. In many cases of pericarditis, carditis co-exists. Myocarditis very rarely occurs except in connection with inflammation of either the investing or lining membrane of the heart.

The importance of these diseases cannot be overrated, and their study is of the highest importance. They are seated in *the* great *vital* organ of the body. They involve great suffering and danger to life. Their remote consequences are very grave. All organic affections of the heart have their origin in the inflammatory. Too many physicians neglect to study this class of affections, greatly to their own detriment and that of their patients. The homœopathic treatment of inflammatory cardiac affections, if skillfully applied, is vastly superior to the ordinary methods. The late improvements in physical examination greatly facilitate correct diagnosis, and enable us to combat these diseases with the happiest results.

PERICARDITIS.

Acute pericarditis — Anatomical characters — Morbid changes — Causes and pathology — Connection with rheumatism — With albuminuria — With Bright's Disease, pyæmia, etc. — Symptoms — Of the heart — Of the circulation — Of the respiratory symptoms — Digestive organs — Brain and spinal cord — Physical signs of pericarditis — Signs furnished by auscultation, percussion, palpation, inspection, and mensuration — Summary — Diagnosis — Prognosis — Treatment.

Inflammation of the investing membrane of the heart is less common than endocarditis, but it is a more serious affection as regards immediate danger.

This membrane is like the serous tissues in other portions of the body, and inflammation results in the same changes in this, as in the pleural and peritoneal membranes. It is more dangerous than the other serous inflammations, because of the small size of the pericardial sac, and the fact that the heart-substance consists of muscular tissue, also because of the important function of the organ and its physiological relations.

In treating of *pericarditis* the following points will be considered: 1. The morbid changes incident to the disease. 2. Its causes and pathological relations. 3. The symptoms, signs, diagnosis, prognosis, and treatment.

Like other inflammatory affections, this has an acute, subacute, and chronic form.

THE MORBID CHANGES.

The inflammation is seldom diffuse, and is generally limited to single spots. The membrane at first looks injected, opaque, sometimes spotted, in consequence of slight extravasations. Acute inflammation speedily leads to exudation of lymph. This exudation takes place, in most cases, probably within a few hours from the commencement of the inflammation. It is at first of a jelly-like consistence, and adheres slightly to the membrane, forming a thin layer, either limited to the base of the organ and about the roots of the large vessels, or extending more or less over the pericardial surface. The heart, at this stage, is said to present

an appearance like that of hoar frost, or to a "layer of liquid gelatine spread upon the parts with a camel's hair pencil." The exudation goes on, and generally, but not invariably, more or less liquid effusion accumulates within the pericardial sac. This effusion varies in quality and quantity. It may amount to a few ounces or to several pints. The exudation either consists of plastic lymph, mixed or not with serum, or blood, very seldom of serum alone.

The *first* stage extends to the time when the accumulation of lymph is sufficient to be determined during life by symptoms and physical signs.

The *second* stage embraces the period during which an appreciable amount of liquid continues.

The *third* stage comprises the duration of the disease after the resorption of the liquid.

These stages have been called stages of exudation, of liquid effusion, and of adhesion.

If the disease do not prove fatal, the liquid is gradually absorbed, and adhesion follows; or absorption occurs without adhesions; or a membrane may be formed from the plastic exudation; or the effused fluid may be changed to pus. The adhesions may be firm and extensive, or delicate and thread-like.

A liquid effusion sufficient to be manifested by physical signs may take place at a period of the disease, varying from one to four days from the date of the attack.

Death usually occurs during the period of liquid effusion.

The effusion is sometimes absorbed quite rapidly, in other cases slowly. In the latter instance, a condition obtains which has been called *dropsy of the heart.*

CAUSES, AND PATHOLOGICAL RELATIONS.

Acute pericarditis is rarely an idiopathic or primary disease. In the great majority of cases it is a secondary affection. There are many cases of which it is an occasional concomitant, but in the larger proportion of instances it occurs either in the course of *acute articular rheumatism*, or the renal affection known as *Bright's disease.*

Of 847 cases of rheumatism, collected from various

sources, and analyzed by Dr. Fuller, it existed in 142, or about one to every six cases.

Of 50 cases collected by Dr. Flint, it existed in 19, or more than one-third.

Rheumatism is more likely to become complicated with pericarditis in the young than in the aged, and occurs oftener in females than in males.

The more acute the rheumatic affection, the greater the liability to pericarditis; and it occurs oftener during first attacks than in subsequent.

That there is an intimate relation between acute rheumatism and pericarditis admits of no doubt, but the common notion that there is a metastasis from the joints to the heart is erroneous, although some cases appear to support the supposition. The facts are that pericarditis often precedes the affection of the joints, and the inflammation of the joints does not usually subside when the heart is affected.

The true explanation of the apparent transfer of the disease, and of the relation existing, is, that the pericarditis and affection of the joints depend upon the same condition of the blood. The analogy of structure between the pericardium and the synovial membranes will account for the liability of the former to become inflamed when the latter are affected.

The connection between pericarditis and albuminuria and uræmic phenomena is now quite definitely ascertained.

Of 35 cases of pericarditis analyzed, with respect to causation, by Dr. Taylor, renal disease existed in 13.

Of 50 cases collected by Dr. Flint, renal disease was present in 7. Of 292 cases of renal disease analyzed by Frerichs, pericarditis occurred in 13. Of 135 fatal cases of pericarditis analyzed by Dr. Chambers, the kidneys were diseased in 36.

Renal disease exists in a larger proportion of the cases of pericarditis which end fatally than of those ending in recovery. The explanation of this is, pericarditis developed in connection with Bright's disease usually ends fatally; whilst in connection with acute rheumatism recovery takes place in a large proportion of instances.

What is the relation between pericarditis and certain renal

affections? It is well known that serous inflammations are apt to become developed in connection with Bright's disease. These inflammations are attributed to the accumulation of urinary principles in the blood, from faulty excretory function in the kidneys. The excess of urea, or the decomposition of its products in the blood, act as poisonous agents, giving rise to inflammation of the pericardial and other serous membranes.

Pericarditis may be associated with pleurisy or pneumonia. It must not be supposed, however, that it obtains by means of extension, but results from the same pathological cause.

Pyæmia frequently co-exists with pericarditis. Wounds, and surgical operations, in tissues remote from the heart, sometimes give rise to pericarditis. The explanation is, the blood becomes poisoned so as to cause serous inflammations.

SYMPTOMS OF ACUTE PERICARDITIS.

The symptoms of pericarditis vary with the three periods of the disease. They are modified by the amount of fluid effused during the second period, and again during the absorption of the fluid in the third stage. The intensity of the inflammation may be in ratio to the severity of the pain.

In some cases, however, pericarditis may run its course with but little pain or febrile movement attendant. But this is equally true of inflammation in any organ, especially in the serous tissues.

The symptomatology of pericarditis is best treated of by taking it up in the following order, namely: The symptoms relating to the heart, and afterwards those referable to the circulatory, respiratory, and nervous system.

Symptoms referable to the heart, (1) *pain*, (2) *tenderness*, (3) *palpitation*.

Pain referred to the præcordia is a prominent symptom in some cases. It is generally burning, lancinating, and often accompanied by a sense of constriction. It is aggravated by inspiration and the movements of the body. The pain is sometimes felt in the epigastrium, or to the right side, or the centre of the sternum. It may extend to the back, to the

left shoulder, and down the left arm, as in angina pectoris. The pain much resembles the pain of pleurisy, with which pericarditis may be confounded. The two diseases may, however, exist at the same time; so also may pleurodynia and intercostal neuralgia. But *pain* in pericarditis may be very slight, or altogether wanting. Dr. Flint says, in the larger number of cases observed by him, the pain was very slight.

It is a disputed question on what the pain depends. Bouilland attributes it to co-existing pleuritis. Flint refers it to the nerves of the heart. Inman says it is a myalgia of the thoracic muscles.

When pain is present it belongs to the early part of the disease. When the inflamed surfaces are covered with lymph, or are separated by liquid effusion, it diminishes or disappears, leaving only a sense of uneasiness in the præcordia.

Tenderness on pressure is generally present, but, like pain, varies in degree, and is rarely very marked. Hope says it may be discovered by pressing on the epigastrium beneath the cartilages of the ribs, in a direction toward the heart, when it is not apparent directly over the heart. Flint asserts that in order to constitute a symptom of pericarditis it must be limited to the region of the heart. If tenderness is diffused, it indicates the presence of pleurisy, or pleurodynia. It is only when taken in connection with other symptoms, that tenderness is of positive value. It is well known that in peritonitis tenderness is sometimes absent; so in pericarditis. Why this is so has not been explained.

Increased action of the heart occurs in pericarditis in the early part of the disease. The contractions are violent, and sometimes irregular, and the patient is conscious of an unnatural beating of the heart. This symptom, however, is by no means constant, and of itself is of little value, because it is found in functional disorder and organic disease.

If, during the occurrence of rheumatism, tumultuous action of the heart is noticed, it should lead to a careful examination.

In the stage of liquid effusion, palpitation cannot occur to any degree, and if the effusion is absent the heart is so

weakened in the second stage as to make palpitation almost impossible.

SYMPTOMS OF THE CIRCULATION.

The *pulse* alone, in this disease, does not furnish positive diagnostic information, but when the diagnosis is made, it aids us in judging of the condition of the heart. At the outset of the disease it corresponds to the increased muscular action of the organ, and is strong, quick, and vibratory, more or less frequent, and sometimes irregular.

As the heart becomes weakened the pulse becomes enfeebled; and when, together with a certain amount of paralysis, there occurs liquid effusion, the pulse becomes weak and small, with greater disturbance of rythm.

Walshe says that the frequency of the pulse "is subject to more sudden variations from the influence of emotional excitement and effort in this than in any other disease." He adds, that he has known a gentle movement of the trunk to raise the pulse from 80 or 90 to 130 or 140.

But to the above statements there are many exceptions. Even in the first stage it may not be more frequent than in health. Graves says it is often "less frequent." It may even continue regular, and in no way abnormal.

Lividity of the lips, face, etc., may be due to a weakness of the heart, and belongs to the second stage of the disease, when it denotes serious obstruction. It is attended with feeble and irregular pulse.

Lividity is caused by congestion of the venous radicles, but generally involves some affection of the pulmonary system co-existing with pericarditis. The deficient aeration of the blood by the lungs may in such cases cause lividity. This symptom is not therefore very important as a diagnostic sign of pericarditis.

RESPIRATORY SYMPTOMS.

Respiration is sometimes accelerated in pericarditis in consequence of the inspiratory acts being shortened by the præcordial pain, and, in such cases, dilatation of the *alæ nasi* may be observed, the dyspnœa may be dependent on conges-

tion of the lungs, incident to compression of the heart by liquid effusion, but it may be absent even when the pericardial sac is largely distended. But this symptom is not always present, for the respiration may be unaffected, or only accelerated by the febrile movement.

Cough, dry, hacking, or spasmodic, is common, and may exist independent of any pulmonary disease. It may, however, be absent in all stages. When a dry, short cough is associated with orthopnœa, a frequent and feeble pulse, and lividity of lips and face, it denotes imminent danger.

The *voice* may be very weak, the patient being unable to speak, except in feeble tones and with great effort. This symptom seems to be connected with copious effusion.

GASTRIC SYMPTOMS.

Vomiting is sometimes present and persistent, and may lead us to a faulty diagnosis in mistaking the attack for gastritis.

Dysphagia occasionally occurs, and was first noticed by Testa, an Italian author. It may be a spasmodic affection, or due to pressure of the distended pericardial sac upon the œsophagus.

SYMPTOMS OF THE COUNTENANCE, POSITION, ETC.

An expression of *anxiety*, or apprehension, is often a prominent symptom. The *risus sardonicus* has been observed in seven cases which terminated fatally. The *position* of the patient is generally on the back, or diagonally, between that on the back and on the side. It is rarely on the left side, the liver in this position pressing on the heart. In some cases the patient can lie comfortably on the right side. Generally, the patient desires to have the head and shoulders raised. But whatever position the patient selects he is *very reluctant* to change it, owing to the great increase of the pain or distress, and the excitement of the heart, which gives rise to a feeling of syncope, especially when the sac is filled with fluid. Fatal syncope has been induced by change of position. Flint refers to several cases, and I have observed it to occur in one case of

rheumatic pericarditis, and in several cases where cardiac disease was complicated with diphtheria.

SYMPTOMS OF THE NERVOUS SYSTEM.

In addition to the mental anxiety, depression, and fear of death observed in cases of pericarditis, actual delirium may exist. It has not been considered an element of the disease.

There are, however, cases of pericarditis in which the cerebral symptoms are so marked that they may mask the cardiac inflammation. These cerebral symptoms may simulate meningitis, mania, dementia, coma, epilepsy, tetanus, and chorea. In many cases of supposed cerebral disease terminating fatally, autopsy shows no appreciable lesion of the brain and spinal cord. But if the examination had included the heart, pericarditis would have been found to have existed.

Dr. Burrows* was the first to call special attention to this connection of cerebral symptoms with cardiac disease. Dr. Flint alludes to several interesting cases of a similar character which came under his observation. These two authors show conclusively that the physician may mistake an inflammation of the pericardium for an inflammation of the brain. In the 16 cases detailed by Burrows there occurred delirium, convulsions, agitation of the limbs resembling chorea, dementia, coma, and seizures resembling apoplexy and tetanic spasms. Flint's cases had delirium, with wild, staring expression, inability to protrude the tongue, shouting as if from danger, coma, great agitation, blindness of one eye, etc. One patient "ejected saliva with great force, and in all directions."

Several cases have come under my own observation. One very notable case, in a girl eight years of age. The symptoms all simulated meningitis, and it was only when my attention was called to the heart by the full and very irregular pulse, that physical examination disclosed the presence of pericarditis.

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* "On Disorders of the Cerebral Circulation and on the Connection between Affections of the Brain and Diseases of the Heart."

Flint says the delirium is peculiar, "the patient lying in a species of coma vigil, the eyes open and fixed in one direction, not replying to questions, and incapable of being roused; this state was followed by maniacal excitement, the patient shouting, and apparently laboring under fear of harm, with occasional ebullitions of hilarity. A fixed delusion of having committed some crime appears to be a distinguishing feature."

From the above symptoms—and this peculiar delirium does not occur in meningitis—and also the absence of acute pain in the head, throbbing of the carotids, injection of the eyes and face, we may know that the disease is not cerebral. The delirium resembles somewhat *delirium tremens*, in which condition the heart is often much disordered. This fact may lead us to understand the curative action of *digitalis* in *mania a potu*.

I wish to call attention to a fact which Flint has not mentioned, namely, the disordered action of the heart in idiopathic brain affections. In some cases of meningitis, and nearly all cases of *tubercular* meningitis, the pulse is at first full and irregular, afterwards soft and fluttering, then intermitting, irregular, full, slow and labored, easily quickened by motion or mental disturbance to double its previous amount of pulsations.

When we reflect that these symptoms also occur in pericarditis, we shall admit that it may be possible for the physician who neglects physical examinations to make a wrong diagnosis. I have seen cases of tubercular meningitis in which the beating of the heart and the character of the pulse simulated pericarditis. The physical signs on percussion were, however, wanting. In such cases the disorder of the heart was functional, or reflex, the nervous irritation being transmitted through the phrenic and pneumogastric nerves, just as in reflex disorder of the brain from pericarditis, but in a contrary direction. I will here remark, that for brain symptoms arising from diseases of the heart, *digitalis* is generally specific; but if the contrary obtains, it is *not* indicated.

PHYSICAL SIGNS OF PERICARDITIS.

The symptoms of acute pericarditis above enumerated are not alone sufficient to enable us to diagnose with certainty the presence of that disease. But by means of the physical signs obtained by percussion, auscultation, palpation, inspection, and mensuration, the disease may now be generally recognized with a degree of positiveness which clinical observers, not many years ago, regarded as unattainable.

Instead of entering into a profuse description of these signs occurring in pericarditis, I shall take the liberty to present the admirable summary given by Dr. Flint, in his work on Diseases of the Heart:

PERCUSSION.

"Enlarged area of præcordial dullness; the extent of this area greater in a vertical than in a transverse direction; its shape corresponding to the pyramidal form of the pericardial sac when distended; the dullness within this area, and the sense of resistance on percussion greater than over the præcordial region in health, or in cases of enlargement of the heart. These signs denote an abundant effusion within the pericardial sac.

"Moderate or small effusion denoted by increased width of the area of dullness at the lower and middle portions of the præcordial region. The increase of the area of dullness taking place within a few days or hours, and progressing rapidly; its extent varying on different days during the course of the disease. Dullness from the presence of liquid below the point of the apex-beat of the heart. Diminution of the area of dullness, with more or less rapidity in the progress of the disease toward convalescence, and its final reduction to its normal limits; when convalescence is established."

AUSCULTATION.

"A friction sound developed, usually, soon after the commencement of the inflammation, depending on the exudation of lymph; rarely wanting during the period of the disease which precedes that of liquid effusion; frequently, not invariably, disappearing during the period of effusion; often returning after the absorption of liquid, and sometimes persisting after adhesion of the pericardial surfaces has taken place. Intensification of the heart sounds at the commencement of the disease, or prior to liquid effusion; during the period of effusion, both sounds weakened, but especially the first sound; the element of impulsion in the first sound notably impaired or lost, and this sound, therefore, consisting of the valvular element alone, resembling the second sound as regards quality and duration; the sounds apparently distant, and the apparent distance greater when the patient is recumbent on the back.

"Cessation of respiratory murmur and vocal resonance, concurring with the results of percussion, in determining the enlarged area of præcordial dullness dependent on distension of the pericardial sac."

PALPATION.

"Prior to the period of effusion, the cardiac impulse abnormally forcible, violent, extending over a larger space than in health, and sometimes tumultuous beating of the heart. After effusion, the point of apex-beat raised, and carried to the left of its normal position. Suppression of the apex-beat, if the quantity of liquid be large. Return of the beat when the liquid diminishes. Vibration of the thoracic walls in the præcordia before, and sometimes after the period of effusion, constituting tactile friction—fremitus. Retardation of the apex-beat in some cases, after a certain amount of effusion, so that the first sound precedes it by a distinct interval."

INSPECTION

"Prominence or arching of the præcordial region in some cases during the period of effusion, if the pericardial sac be distended, observed chiefly in young subjects; the prominence presenting an indistinct outline of the pyriform shape of the pericardial sac. Restraint of the respiratory movements of the left side, if the quantity of liquid be large, and also, prior to effusion, in some cases, from pain felt in the act of inspiration. Undulatory movements in the intercostal spaces over the pericardium distended with liquid, in a very small proportion of cases. Depression of the præcordial region in some cases, after the absorption of liquid."

MENSURATION.

"Prominence of the præcordia in some cases, produced by liquid accumulation in the pericardial sac, determined by callipers. Sudden development, or increase of prominence, and its sudden or rapid disappearance."

DIAGNOSIS.

If the physician depends altogether upon the *symptoms* supposed to indicate pericarditis, he will find the diagnosis of the disease to be difficult, and often impossible. It has been shown that cases may occur which do not show symptoms of a positive character. It is only since the discovery of physical exploration, that the diagnosis is made comparatively easy. But since this method is still neglected to much extent, pericarditis is habitually overlooked by many medical practitioners.

There are many diseases having pathological relations to pericarditis, and during the progress of those diseases we should be on the watch for the earliest evidence of its development. During the progress of *acute rheumatism* the præcordial region should be daily explored with reference to the signs of pericarditis, as well as endocarditis. We may, in such cases, discover the friction-murmur before the patient

makes any complaint of pain or other symptoms denoting that the pericardium has become involved.

In view of the fact that inflammation of the pericardium as well as other serous structures, is liable to be developed in patients affected with *disease of the kidneys*, we should not neglect to examine the chest from time to time.

The diagnosis of pericarditis from *pleuritis* or *pneumonia* is sometimes difficult. In such instances the heart should be closely interrogated.

We may hear a friction-murmur in pleuritis, produced *outside* the pericardial sac. It will be found difficult to discover the presence of liquid effusion in the pericardium when, at the same time, it exists in the *left* pleural sac; while, if the effusion is in the right pleural cavity, we can readily distinguish it from pericardial effusion.

Flint says that he has known acute uncomplicated pericarditis to be considered and treated, throughout the disease, as pleurisy, when the diagnosis was based on *symptoms* alone, and I have no doubt but such instances are very numerous, too numerous in fact for the dignity and honor of medical science.

Dropsy of the pericardium may be mistaken for the stage of pericarditis with effusion. But the former rarely occurs except in connection with general dropsy, and then not to the same extent as in pericarditis. Moreover, hydro-pericardium is not preceded by pain, tenderness, fever, etc., nor is it attended by the friction-murmur.

PROGNOSIS.

Pericarditis is always a serious affection, and its progress should be watched with great solicitude. In no disease must we attend so closely to the development of the various stages.

Different observers vary in their testimony as to the fatality of the disease. Dr. Hope declared that in ten years he did not lose a case. Of 106 cases analyzed by Louis, 36 died. In 84 cases reported by Latham, only 8 died. Of Dr. Flint's 50 cases, 27 died; but these were unusually bad cases variously complicated.

According to Flint, pericarditis is least fatal when rheumatic; more dangerous when occurring during renal affections, eruptive and continued fevers, pyæmia; and generally fatal when associated with marked disorder of the nervous system, giving rise to mania, tetanus, chorea, etc. Under judicious homœopathic treatment this rate of mortality would probably have been less. Dr. Russell's success in the London Hospital was certainly very satisfactory.

The *duration* of the disease is variable. It may prove so rapidly fatal as to kill in 24 hours. It lasts usually from one to two weeks, and, if not ending fatally in this time, ends in recovery, or the chronic form.

The termination, in favorable cases, is more or less adhesion of the pericardial surfaces. Flint considers it doubtful if the exudation is ever completely removed by absorption —leaving the surfaces unattached and free from disease. He also considers it *the* rule that the pericardial sac is obliterated, from adhesion throughout its entire surface. Of 156 cases of pericardial adhesions analyzed by Louis and Chambers, 111 were universal.

Death occurs in pericarditis from arrest of the circulation, from paralysis of the heart, from the combined effects of the pressure of the liquid effusion and the proximity of the inflamed membrane to the muscular fibres of the organ. It must be remembered that death from the slightest over-exertion may occur during the stage of effusion.

TREATMENT.

The treatment of inflammatory cardiac affections has not yet received that careful study in our school which their importance demands. Notwithstanding this, we can safely assert that our treatment is far more successful than that of the allopathic school; or, with greater propriety it might be said, than the *former* treatment by that school, which consisted of blood-letting, calomel, blisters, opium, etc. The allopathic treatment, as at present adopted by its best practitioners is far more rational than ever before—it is even homœopathic—as witness the treatment advised by Dr. Flint, who discards blood-letting altogether, and says of

mercury, that it should not be used in Bright's disease, anæmia, or any cachectic state; and other authors deny its efficacy in idiopathic or rheumatic pericarditis. Flint says of opium, that it is a very important and valuable remedy, but he relies more upon *aconite* and *digitalis* than any other agents, and these he uses in a strictly homœopathic manner.

If the homœopathic school is limited to a few remedies, it is because our provers have not paid sufficient attention to objective symptoms. In but few of our provings has any proper record been made of the cardiac symptoms developed. The objective symptoms have been neglected, and the subjective only vaguely recorded. Not only this, but even in the few reported clinical cases of heart-disease found in our literature, no physical exploration of the chest was made, to confirm the diagnosis, and in many cases we are in doubt whether they were really cases of disease of the heart.

The following are the chief remedies to be selected in *pericarditis:*

Aconite. The symptoms of the aconite-heart-disease are prominent and unmistakable. It is indicated in the *first* stage of the disease, or until the exudative process is completed. It is not so often indicated in the second stage—or stage of liquid effusion—and rarely in the third stage. The action of aconite is twofold. Primarily, in large doses it depresses the vitality of the heart even to the point of paralysis. But the reaction which occurs is a secondary effect, and results in hyperæmia and inflammation; but this inflammation does not go to the extent of causing liquid effusion, nor does it cause organized exudation of lymph. The following are the symptoms for which it is indicated in the first stage:

The beats of the heart are more violent and rapid; the pulse hard, strong, and *contracted* (*not* full and bounding). The pain, if any is felt in the cardiac region, is burning, lancinating, and constrictive, or stitching. There may be tenderness on pressure over the cardiac region, or in the epigastrium under the ribs. The skin is very hot, with burning and intense thirst. The urine scanty and red. The countenance expresses great anxiety, and there is always

present a fear of death. The position of the patient is on the back, with the head and shoulders raised. Any movement aggravates the pain, if any. But cases of pericarditis occur without pain, and here we must depend on physical signs. If fever is present, and the heart's action is hard and rapid, and pulse hard, and percussion and auscultation shows the first stage, then is aconite still indicated. It is *not* indicated in the first stage of pericarditis, when the cause is Bright's disease, or pyæmia, but only in idiopathic, traumatic, or rheumatic cases.

If we expect *aconite* to act well in this stage, we must give the lower dilutions, 1st to 3rd, or even a few drops of the mother tincture in half a glass of water, a spoonful repeated every hour or two. Nor shall we find it useful after the first 12 or 36 hours. So soon as we discover the pulse to grow weaker, and the action of the heart less violent, the size of the dose must be changed, or some other remedy must be selected. Baehr says, "*Aconite* is not only indicated at the commencement of the disease, but, in many cases, during its whole course, more especially in rheumatic cardiac inflammations, so long as the organic alterations do not result in paralytic or cyanotic symptoms."

I cannot support these assertions. *Aconite* is indicated in the second and third stages, but not on account of any inflammatory action supposed to be existing, but because it is homœopathic to threatened paralysis. Baehr himself admits this, virtually, when he says aconite is also indicated when the "beats of the heart become slower, or else they remain quick, and grow feeble or irregular; or a feeble and small pulse, not synochrous with the beats of the heart, intermitting or unequal, the temperature is lower, and the number of respirations increase rather than decrease." But Baehr says nothing about changing the size of the dose when the symptoms change. The physician who gives the same dilution of *aconite* in the second as in the first stage will be disappointed, and do injury to his patient.

The dose in the second and third stages should never be lower than the *third* dilution, unless the powers of absorption are very feeble. These stages are similar to the primary stages of aconite-poisoning, when the cardiac nerves are

brought to the verge of paralysis. The 30th or 10th is the proper attenuation to use when we give it for feeble and irregular cardiac action.

Asclepias tuberosa will be found useful in some cases of pericarditis. Its action is quite analogous to *bryonia*. The symptoms point rather to a sub-acute than an acute condition. I have used it in one such case with excellent results. The asclepias-fever is not intense, the pain in the cardiac region is pricking, there is shooting pain near the left nipple extending to left shoulder, with a feeling of constriction in the region of the heart. A dry, spasmodic cough, with some dyspnœa, is generally present. The pain in the chest is relieved by bending forward. There is palpitation of the heart, with pulse 88 and small. It is indicated in sub-acute cases, with liquid effusion, the absorption of which it hastens, and should be used in the lowest dilutions. The *asclepias syriaca* is indicated in similar conditions, namely, the second stage, when the disease is connected with uræmia, with copious liquid effusion. Its action on the kidneys is similar to colchicum.

Bryonia alba is doubtless one of our most valuable remedies in the first and second stages of pericarditis. Its action begins when the exudation of plastic lymph appears, and as this often occurs very soon, it is best to alternate it with *aconite*, or follow closely after that remedy. It is indicated in those cases of idiopathic or rheumatic pericarditis, with or without pleurisy, with intense fever, frontal or occipital headache, and acute stitching pains aggravated by the slightest movement. I do not consider it the best remedy in cases of liquid effusion, nor does it do any good in cases of feeble, irregular, or intermittent cardiac action. The heart's action is not violent or tumultuous, but the friction-murmur is always heard, dulness on percussion is present, the point of apex-beat raised and carried to the left, and the heart's sounds intensified (at first), then both sounds weakened. It is of no value in pericarditis from Bright's disease or pyæmia, nor when the effusion is copious, and aeration of blood deficient.

Arsenic. The testimony relating to the efficacy and applicability of arsenic in pericarditis is quite conflicting. Baehr

says, "we have never seen any good effects from it in acute conditions. It is a remarkable fact that among the large number of cases of poisoning by *arsenic*, *post-mortem* examinations have never yet revealed a single symptom that might lead us to infer that *arsenic* exerts a specific action upon the heart."

Dr. Russell, on the contrary, asserts that *arsenic* exerts a powerful influence on the heart and lining membranes, both internal and external. He quotes Orfila, who found "small spots of a bright crimson color in the left ventricle and on the columnæ carneæ, and this color penetrated deeply into the substance. The right cavities presented spots of much deeper red—almost black color." But he did not find the serous membrane inflamed.

If *arsenic* is homœopathic to pericarditis, it is to that variety caused by uræmia or pyæmia, in which conditions the nervous life of the organ is poisoned. It may be homœopathic to carditis, and also to the second stage of sub-acute or chronic pericarditis, with serous or liquid effusion, associated with great irritability and tendency to paralysis.

The symptoms indicating arsenic are: great anxiety in the region of the heart, with fear of death; tightness in the præcordia; cannot lie down; dyspnœa and palpitation after the slightest motion; great thirst; violent, tumultuous action of the heart, *alternating* with feeble, irregular beating; tendency to fainting; pulse strong and jerking, or feeble, fluttering, and irregular; cold skin, hands, and feet. The pain is piercing, burning, and a sensation of soreness in the region of the heart.

The physical signs on percussion and auscultation are: dullness over a greater extent than usual in the cardiac region, especially in a vertical direction; the element of impulsion in the first sound is impaired or lost, the sounds apparently distant.

The *iodide of arsenic* will doubtless prove a superior remedy in such cases. *Dose*, the 3rd or 6th trituration.

Digitalis is one of the most useful remedies in pericarditis, but in order to use it successfully you must fully understand its sphere of action. Not only this, but you must know how to graduate the *dose* to suit the varying phases of the disease.

I will first give you the opinion of Baehr, and then my own. He says, "Since I have devoted, for years past, special attention to the use of this drug, I have found it much more frequently applicable in the treatment of disease than in former times; and I am now prepared to assert most positively, what I was then only able to announce in rather dubious language, that *digitalis* is an excellent remedy in acute diseases of the heart; more particularly in *pericarditis*. *Digitalis* is not so much adapted to inflammations setting in with very violent symptoms, but to inflammations approaching in an insidious and scarcely observable manner, more especially without any local pain, but with a rapidly increasing embarrassment of the respiration. We should take a very one-sided view of the action of this drug, if we were to regard the irregularity and slowness of the pulse as the chief criterion for its application, since a rapid and very weak pulse constitutes an equally reliable indication. Even a violent excitement of the functional activity of the heart, as generally occurs at the commencement of cardiac inflammation, is in characteristic accord with the first symptoms of poisoning by *digitalis*. Among all the various forms of cardiac inflammation, we consider the rheumatic form the best adapted to *digitalis*, and likewise if it is associated with a copious effusion of serum; less, however, in pericarditis, if the friction murmurs continue unchanged from the beginning of the disease. The sooner these murmurs disappear, the better is *digitalis* adapted to the case. * * Among the general symptoms, the following invite more particular attention to the use of *digitalis:* Rapidly increasing dyspnœa, with occasional symptoms of acute congestion of the chest; inflammation of the pleura or lungs; bronchitis; chronic catarrh of the bronchia; expectoration mixed (not streaked) with blood; spasmodic cough; livid, turgescent face, with blue lips, headache, vertigo, delirium, sopor, vomiting, at the commencement or during the course of the disease; hyperæmia of the liver; slight icterus; catarrh of the kidneys; excessive feeling of illness, not corresponding with the perceptible symptoms; great anxiety, but without any continual restlessness; aggravation by the slightest motion; a drawing, tearing pain in left shoulder."

Dr. Baehr's experience coincides with my own. In my several papers on the action of *digitalis* I have always contended for the double action of this drug, and unless such action is fully understood, you cannot prescribe it successfully. In its primary action, *i. e.*, its pathogenetic effect in large doses, it first causes a hyper-stimulation of the cardiac tissues, manifested by increased force, and *sometimes*, not always, frequency of the heart's action; and this may go on to the very verge of acute inflammation, or to a condition of the heart culminating in tetanic spasm of that organ. *Digitalis* is not so much indicated in acute as *sub*-acute pericarditis, in its first stages. It is not indicated for plastic exudation, but only for serous effusion; and not so much for the inflammation itself, as its results, and the excessive irritation of the cardiac nerves which attends it. If given in the first stages the doses must be made very small, not lower than the *third* decimal dilution. It is very important to understand the secondary action of *digitalis*. After it has exhausted the nervous and vascular irritability of the heart by its primary action, a contrary condition sets in. The heart's vitality is lowered, its pulsations decrease in *force*, but increase in frequency, or become very irregular and intermittent; the slightest motion or excitement increases the heart's action in a very distressing manner, and death may occur from cardiac paralysis.

You will observe that Baehr mixes the primary and secondary symptoms and conditions in his indications. This is unfortunate, for if the practitioner does not separate the two states, he will forever be in the dark regarding the true action of the drug, and never be able to prescribe it with safety and benefit to his patient.

I have given you the symptoms and conditions indicating *digitalis* in the first stage of pericarditis, and the dose required. Its most useful sphere, however, is in the second and third stages, or those conditions characterized by liquid effusion, failure of the nervous and muscular power of the heart, from pariesis or over-distension, and accompanied by excessive irritability. The physical signs in this condition are: absence or decrease of the friction-murmur; rapidly increasing dullness over a large area; heart-sounds weakened,

especially the first, the element of impulsion in the first sound nearly or entirely lost, the sounds apparently distant. The posture is generally with the head and shoulders raised. The patient cannot lie on the left side, the slightest movement increases the distressing dyspnœa. Sometimes the urinary organs are affected, and urination becomes frequent and painful — the secretion scanty, but of nearly normal color. An excessively *faint* "empty" feeling at the pit of the stomach is a notable indication for *digitalis*. Under its use the effusion rapidly diminishes; the heart's action soon improves in force; its irritability diminishes with the increased tonicity; the lividity of the face and lips disappears, as does the dyspnœa, vertigo, and imperfect circulation everywhere. But in order to effect this curative action, you must know the requisite dose. Any attenuation above the third decimal is useless. The tincture, or first decimal, is usually required, and must be given in doses of one to five drops every hour or two until decided improvement sets in, when the intervals between the doses may be lengthened, or the quantity decreased. I have frequently found the patient so near cardiac syncope, that I have without hesitation given *ten* drops of the strongest tincture, and, with my finger on the pulse, watched its effects. If the pulse did not rise, or increase in force in fifteen minutes, the dose was repeated, and this was continued until I was satisfied the dangerous exhaustion was over. In such cases of threatened or actual collapse, you may think *veratrum album* or *arsenicum* better indicated, but neither are as reliable as *digitalis*. After you have warded off the immediate danger, prescribe the *digitalis* in smaller doses, and place the patient under the influence of wine-whey, egg-nogg, beef-tea, cocoa, and other highly nutritious articles.

Spigelia is an important remedy in pericarditis, but the provings were conducted with such disregard for physical or objective symptoms, or even correct subjective symptoms, that it is difficult to define clearly its curative sphere.

Baehr says the symptoms given by him are not pathogenetic but clinical, and even these "do not contain the symptoms of sero-plastic or serous pericarditis. On the other hand we distinctly recognize in this complex of symptoms, both the

purely *plastic*, as well as incipient endocarditis." He further adds that "according to practical experience, *spigelia* is particularly adapted to rheumatic pericarditis, likewise to sero-plastic pericarditis during its whole course, especially if the patient complains of internal local pain;" but he asks "upon what basis are we to prescribe spigelia in cases where the disease is painless and has scarcely any symptoms?"

He gives the following symptomatic indications from Hartmann; indications which are based on curative results on the sick, namely: "Undulating motion of the heart; indistinct beats of the heart running into one another; when laying the hand upon the heart, tumultuous beating of the heart, in a recumbent as well as in a sitting posture, not synchronous with the radial pulse; spasms of the chest; suffocative complaints; tremulous sensation in the chest and temples, increased by motion; tearing sensation in the chest when raising the arms over the head, and when touching the pit of the stomach; purring murmur during the beats of the heart; stitches in the region of the heart; pulsations of the carotids with a tremulous motion; great dyspnœa at every change of position; bright redness of the lips and cheeks, changing to pallor during every motion; the impulse of the heart raises the four last true ribs, the sternum and xiphoid cartilage, and displaces the dorsal vertebræ; audible beating of the heart, causing a pain that is felt through to the back; cutting pains from the heart to the shoulders, as far as the head and arms; excessive dyspnœa, with a pressing, cutting pain in the abdomen, at the insertion of the ribs; arthritic pains and stiffness of the joints; dull stitches where the beats of the heart are felt, and recurring with the measured regularity of the pulse; the beats of the heart can be felt through the clothes, with anxious oppression of the chest; scraping in the throat, affection of the tracheal and bronchial mucous membranes; the beats of the heart are not synchronous with the pulse; purring murmur." (Dose, 3rd to 12th dilutions.)

Nitrum (kali nitricum) ought to prove curative in some cases of pericarditis, especially if it appears as a complication

of acute rheumatism or Bright's disease. It has many symptoms which indicate its use in cardiac inflammation.

Gelseminum is rarely indicated in acute inflammations of the heart. It may be useful in the *first* stage, and for a very short time. It is useful in cases having a *catarrhal* origin; rarely, if ever, in rheumatic pericarditis; and never when from diseases of the kidneys.

The symptoms calling for its administration are: chilliness, then fever, with feeling of dullness, heaviness and swimming in the head (occiput); stitching sensation in the region of the heart; constrictive pain around the lower part of the chest; sudden attacks of suffocation; inspiration of a sighing and catching character; expirations sudden and forcible; heart's sounds intensified; pulse full, rapid, soft.

For these symptoms the proper dose lies below the 2nd dilution. No result will be gained in inflammatory affections if the higher attenuations are used. Its administration should not be continued after the pulse becomes slower and softer, unless we change the dilution to the 6th or 12th, for if indicated in the third stage, it is for the tendency to paralysis of the heart, which is a primary effect of the medicine.

Veratrum viride. The same remarks are applicable to this medicine that have been applied to gelseminum. It may, however, be given in those cases of idiopathic or rheumatic pericarditis that are ushered in by violent fever, full, hard, bounding pulse, with congestion to the head, throbbing carotids, etc. The pain is burning, constant, with oppression of the chest; sensation as of a heavy load on the chest; heart's action violent and tumultuous; respirations rapid, labored, and sighing. *Dose*, 1 drop of the tincture, or first decimal dilution, repeated every two hours.

Unlike the *veratrum alb.*, it cannot be used in the second or third stages, unless we have the rare phenomena of vomiting, cold skin, pulse 20 or 30, and here it must be given in the 6th dil.

In cases of poisoning by *verat. v.* (in cats) serum to the amount of 15 to ½5 was found in the pericardium.

Colchicum has been recommended for pericarditis, especially rheumatic. Baehr says, "it seems to us to be

improperly ranked among cardiac remedies." In cases of poisoning, no pericardial lesions were observed; in fact the pericardial sac was found *empty*. Muller, however, says that *colchicum* is more suitable for pericarditis than endocarditis. Baehr asserts that all the heart-symptoms are secondary from loss of fluids. In Laurie's Practice a case is reported where colchicum removed the following symptoms (after *lach.* and *ars.*): dullness on percussion over a larger space; friction-noise at the sternum stronger than before, impulse more powerful, but the natural heart-sounds impaired and distant; great dyspnœa and faintness on the slightest movement; oppression after eating or drinking ever so little; no cardiac pain; position on the back, with head and shoulders raised." This would seem to prove that it was useful in the second stage. It is probable that the best indication for *colchicum* in pericarditis is the co-existence of rheumatic inflammation elsewhere, and the urinary symptoms indicating that medicine.

Dose: The dilutions from the 1st to the 6th

Tartar emetic, according to Russell, is a good remedy in some cases of rheumatic pericarditis, and for the following urgent symptoms: "*Great dyspnœa*, and violent pain at the heart, with cough." But he evidently does not believe it to be a specific remedy, but removes this dyspnœa, etc., by its action on the lungs, and its effect on "the pulmonary branches of the pneumogastric nerve, by sympathy with the cardiac."

Dose: Grain doses of the 2nd or 3rd dec. trituration.

Kalmia latifolia. Of this remedy Hering says, "No remedy in the whole materia medica has such control over the pulse, except *digitalis*." "In diseases of the heart which alternate with rheumatism, or have originated in rheumatic attacks, kalmia must become important." No clinical reports have been made to substantiate this statement, nor do we know of any reliable symptoms of the medicine indicating its use. If useful at all, it is in the first stage.

Cactus grandiflorus was strongly recommended by Dr. Rubini for "all inflammatory affections of the heart." He does not, however, mention pericarditis among his clinical observations, but says it cures pleurisy and inflammations

of serous membranes. If homœopathic to pleurisy, it is probably also to pericarditis. The symptoms seem to indicate its tendency in that direction: "Sensation of constriction of the heart. Dull, heavy pains in region of the heart, increased by external pressure. Pricking pain in the heart, impeding respiration and motion of the body. Very acute pain, and such painful stitches in the region of the heart as to cause him to weep and cry out loudly, with obstruction of respiration. Palpitation of the heart continues day and night. Fever, with great heat, violent pain in the head," etc. It is to be greatly regretted that Dr. Rubini made no observation of the pulse, or examined the condition of the heart by physical exploration. Such neglect is a loss to science, and utterly unpardonable. Cactus may be indicated in any stage of pericarditis, and the best effects have been obtained from the lowest dilutions.

Cannabis. Baehr seems to confound the cannabis *indica* (haschisch) with *cannabis sativa*, which latter possesses, in no degree, the cerebral symptoms of the former. *Cannabis sativa* has been recommended in pericarditis, but upon very unreliable data. Baehr gives the following symptoms of *cannabis indica:* "Violent palpitation of the heart, sometimes without any anguish, sometimes attended with perfect agony." It is indicated in cases of pericarditis with cerebral symptoms. *Dose*, 1st to 3rd dilution.

Sulphur has not usually been mentioned in connection with pericarditis, but its pathogenesis contains many symptoms relating to the heart. From analogy, however, I claim that it ought to receive more attention as a cardiac remedy.

You have been taught how useful it is as a remedy in pleurisy, in the stage of exudation, also its power over obstinate inflammations.

Its action on the pericardium is doubtless the same as on the pleura. If it will cause absorption of plastic lymph in one serous membrane it will in any other. Baehr mentions "a case of pericarditis where uncommonly loud friction-murmurs and a rubbing of the pericardial surfaces against each other, that could even be felt by the hand, and had already existed for upward of three months, disappeared entirely after sulphur had been given for a fortnight." You

may give sulphur with great confidence where there is plastic exudation, if the inflammation seems to linger, notwithstanding the free use of bryonia. (Dose, 1st to 30th.)

Iodine, or *iodide of potassa*—I prefer the latter—will be found useful in cases quite similar to those for which I have recommended sulphur. Iodide of potassa has great power in causing absorption of morbid products. It removes the plastic and serous exudation in pleurisy and pericarditis. The pathogenetic symptoms recorded in the *Symptomen Codex* are very suggestive, and closely simulate the pains of pericardial inflammation. (Dose, one-half to two grains in an ounce of pure soft water every four hours.)

The alkaline treatment, although not dynamic, but chemical in its nature, has some claims upon your attention. The theory advanced in its support is this: alkalies are supposed to exert their effect by neutralizing the *materies morbi* in the blood, and also to eliminate them from the body. The bicarbonate of potassa or soda are the alkalies preferred, and it is considered necessary to give as much as three or four drams daily, until the urine becomes *alkaline*. It is claimed by Fuller, that rheumatic pericarditis may be prevented if the alkaline treatment is carried to this extent. Dr. Richarsdon's researches appear to substantiate this assertion, for of 48 cases in which the "full alkaline treatment" was employed, the heart was affected in but *one* case. He contrasts these with 110 cases treated by bleeding, nitre, mercury, etc., where the heart was affected in 35. Flint, however, says he has known cases in which pericarditis occurred during the "full alkaline treatment," and after alkalinity of the urine had been produced. Dr. Russell (homœopathist), in his Clinical Lectures on Rheumatism, approves of the alkaline treatment, and says that it cannot interfere with the action of specific remedies. He believes that we ought to neutralize and eliminate the lactic acid, and thus remove the cause. He also believes that both *aconite* and *bryonia* act by removing the cause which develops the lactic acid, and in this way, perhaps, act as curative agents in rheumatic affections.

I have frequently tested the value of the alkaline treatment, and believe acute rheumatic affections generally run

a shorter course under such treatment. You may give ten or twenty grains, or more, of the bicarbonate of soda or potassa, or the citrate of potassa, largely diluted with gruel or pure water, three or four times a day, until the urine becomes alkaline, which condition is readily ascertained by testing that secretion with litmus paper.

RECAPITULATION.

For *pericarditis*, as a complication of acute rheumatism, the remedies are, *aconite*, *gelseminum*, *veratrum viride*, *asclepias tuberosa*, *bryonia*, *cimicifuga*, *colchicum*, *cactus*, *nitrate* and *iodide of potassa*, *digitalis*, *spigelia*, and *sulphur*.

For *pericarditis* from Bright's disease, *arsenicum*, *phosphorus*, *kali nitricum*, *colchicum*, *asclepias syriaca*, *digitalis*, and *benzoate of ammonia*.

For *pericarditis* from pyæmia, *arsenicum*, *baptisia*, *phosphorus*, *carbolic acid*, and the *sulphite of soda*.

For threatened *cardiac paralysis*, *digitalis*, *veratrum album*, *lachesis*, *naja*, *gelseminum*, *aconite*, *veratrum viride*, and *arsenicum*.

For pericarditis, with *pneumonic* complication; *phosphorus*, *tartar emetic*, *kali nit.*, *sanguinaria*, *bryonia*, *veratrum viride;* with pleurisy; *bryonia*, *asclepias tuberosa*, *arnica*, *iodide of potassa*, *sulphur;* with cerebral irritation, *cannabis ind.*, *veratrum alb.*, *cimicifuga*, *belladona*, *digitalis*, and perhaps *opium*.

For *hydropericardium*, or copious effusion of serous fluid, *digitalis*, *arsenicum*, *colchicum*, *apocynum cann.*, *benzoate of ammonia*, *nitrate* and *iodide of potassa*, *iodide of arsenic*, and perhaps *apis mel.*

DIETETIC AND HYGIENIC TREATMENT.

During the first or acute inflammatory stage, the diet should consist of the lightest kind of food. Cardiac inflammations do not exhaust the general system as much as other inflammations, and less food will sustain the vital forces. All stimulating or highly nutritious food and beverages should be prohibited. Mental and bodily exertion must be avoided as much as possible.

In the stage of effusion, when the heart becomes weak and

irritable, the only change in diet and regimen you should advise, would be to permit light soups and broths, or weak beef-tea, if the patient desires them. In this stage *tea* should be strictly prohibited, and absolute mental and physical repose insisted upon. In threatened paralysis you may administer cautiously alcoholic stimulants, beef-tea, carbonate of ammonia, and even apply the electro-galvanic current in desperate cases.

If I have not fully impressed upon you the importance of insisting upon absolute quiet, and the recumbent posture, I will here repeat, that you should insist that the patient must not be raised in bed to eat, drink, urinate or defecate, nor turn on his side unaided, for any such movements in severe cases may result in fatal syncope.

External applications on the chest, over the region of the heart, may be of benefit in some cases by assisting in the reduction of the inflammation, or palliating the pain. Warm poultices of flax-seed meal, medicated with *tincture of aconite* or *verat. viride*—or compresses of quite warm water, may be applied during the first stages. In the latter stages, I cannot recommend you to prescribe any external application.

LECTURE VI.

ENDOCARDITIS.

Definition — Anatomical Characters — Causes and Pathology — Symptoms — Physical Signs — Diagnosis — Prognosis — Treatment.

GENTLEMEN: I shall, in this lecture, take up one of the most important of the inflammatory affections of the heart; more important than pericarditis, because of the serious valvular lesions which it usually leaves.

An inflammation of the membrane which lines the cavities of the heart, and is duplicated to cover the valves, is called endocarditis. It is not more than fifty years since this disease has been clearly described and recognized, but clinical experience has demonstrated that it is by no means infrequent. In the majority of cases it occurs as a complication of acute rheumatism. The inflammation may be acute, subacute, and chronic, but these distinctions are not of practical value.

ANATOMICAL CHARACTERS.

This inflammation is said to be confined, in the vast majority of cases, to the membrane lining the cavities of the left side of the heart. The lining membrane of the right auricle and ventricle is rarely inflamed, and when inflamed it is also present on the left side.

All portions of the endocardial membrane of the left side are not equally subject to inflammation. You must bear in mind that it generally attacks the membrane covering the valves and lining the orifices, and that it is in these situations that it leaves the most troublesome results. There are two reasons for the tendency to attack these localities. 1st. The membrane here is most exposed to the blood-currents; the valvular portion is in constant motion, and is almost constantly in a tense or strained condition. 2nd. The mem-

brane is here underlaid by fibrous tissue, and not, as in other situations, in close proximity to the muscular walls of the heart.

Flint believes there are grounds for believing that the fœtus *in utero* is subject to endocarditis, and that the inflammation is then limited to the *right* side. He believes the malformations found in infants—cyanosis, etc.—may thus be accounted for.

In the occasional instances in which death has occurred during the inflammation, there has been found (a) redness from vascular injection, (b) alterations in the membrane itself, and (c) the presence of inflammatory products.

(a) *Redness*, due to endocarditis, is caused by injection of the vessels which ramify in the areolar tissue beneath the membrane, but it is not always found, and may disappear as a *post-mortem* change. But the *redness*, when found, is not always a proof of inflammation, for it may be the effect of the imbibition of hæmatin dissolved out of the red globules of the blood which the cavity contained after death. This redness from imbibition, however, is distinguished from that due to inflammation by these differences: (1) It is not an arborescent, but a uniform redness, and when examined with a lens, injected vessels are not visible; (2) It has a deeper and darker color than inflammatory redness; (3) It is *not* more likely to be limited to the left than the right side, nor is it usually limited to the valves and orifices, and is more conspicuous in the arteries than in the cavities of the heart. Moreover, in redness from imbibition, the membrane preserves its normally firm, polished appearance.

(b) *Alterations in the membrane itself* are much more indicative of inflammation than redness. These changes are: "loss of the smooth, polished appearance which the membrane has in a healthy state; instead of which it becomes opaque, rough, velvety, and felt-like; more or less swelling and softening; and brittleness of the subjacent areolar tissue." (Flint.)

(c) *The presence of inflammatory products* will prove to you conclusively, if present, that endocarditis has existed. You remember that the endocardium, unlike other serous membranes, is *not* a shut sac, wherein inflammatory products

may be collected and retained. Such products may be washed away by the currents of blood and carried along with the circulation. Another difference is that the free surface of the endocardium is in contact with the blood itself, and that while the fluid detaches and removes morbid products, it may also *furnish* deposits by yielding a portion of its fibrin, which undergoes coagulation.

These products of inflammation, then, may be derived from two sources, namely: the exudation of lymph, and the coagulation of fibrin from the blood. The exuded lymph occurs on the free surface of, as well as beneath, the endocardium. That on the free surface, if not washed away, forms layers, as in pericarditis. The roughness of the exuded lymph attracts—as it were—fibrin from the blood, as the threads did when passed through the arteries in Dr. Simon's well known experiments. When we consider that in acute rheumatism the fibrin of the blood is in excess, we can see how the tendency to fibrinous depositions is greatly increased in endocarditis from that cause.

Various *morbid growths* are to be enumerated as the result of endocarditis. They are commonly called *vegetations*, and are found either at the base or the free extremities of the valves. They occur in the form of small granular masses, or beads, from the size of a pin's head to a millet seed, studding the margins of the curtains of the mitral valve, and fringing the crescentic extremity of the fibrous portion of the segments of the valves of the aorta.

Virchow denies the occurrence of the exudation of lymph in endocarditis. He charges the formation of excrescences and membraniform layers wholly to proliferation or morbid growth, and the coagulation of coagulated fibrin from the blood within the cavities of the heart. Flint, however, believes that morbid growths may have, as a nucleus, the true vegetations or exuded fibrin, to which may be added the coagulated fibrin from the blood.

Other morbid changes may occur, namely: loss of substance by ulceration and erosion; perforation of the valves; lacerations; and even gangrene. Among the rarer occurrences are adhesions of the valves to each other, or to the walls of the heart.

The *remote* effects of endocarditis will be considered in future lectures, when we come to consider the Organic Diseases of the Heart. I will only say here, that in a very large proportion of cases, valvular lesions, involving either obstruction or regurgitation, or both, owe their origin to the anatomical changes which occur as a result of endocarditis. It may be months or years before serious structural changes obtain; but you should carefully watch your patients who have had this disease, and be on the look-out for the first symptom of organic affection, for it is rare that they are escaped altogether.

CAUSES AND PATHOLOGICAL RELATIONS.

Endocarditis is rarely an idiopathic affection. Like pericarditis, it is usually associated with acute articular rheumatism. It differs, however, from the former, in occurring independently of that affection, and is a comparatively rare affection as occurring in other pathological connections. When the two diseases occur together, the combined affections are designated *endo-pericarditis*.

Of 474 cases of rheumatism, collected and analyzed by Fuller, endocarditis existed in 214, the ratio being 1 to every 2.25 cases. Of 204 cases, endocarditis existed in 138, pericarditis in 19, and endo-pericarditis in 38. Bamberger says endocarditis occurs in 20 per cent. of all cases of rheumatism.

The connection of endocarditis with acute rheumatism is the same as that of pericarditis. It is not developed as a metastasis, but depends upon the same morbid condition that causes the rheumatic affection.

Endocarditis may become developed in connection with renal disease, owing to the analogy of structure between the endocardium and the serous membranes. (See Pericarditis.)

It is said that in non-rheumatic endocarditis the aortic valves are more likely to be the seat of inflammation than the mitral; the reverse being true, as has been seen, of rheumatic endocarditis.

Endocarditis and pericarditis are frequently associated. Fuller says that in 204 cases, analyzed by him, this combina-

tion existed in 38. Either affection may take precedence in point of time.

Endocarditis is sometimes associated with pleurisy or pneumonia. It is less frequently associated with these affections than pericarditis. Endocarditis is occasionally developed in connection with the eruptive and continued fevers, and with that morbid condition known as pyæmia, but its occurrence in these connections is rare. It may also be produced by injuries of the chest; but cases of traumatic endocarditis are rare.

The experiments of Richardson, made by injecting into the peritoneal cavity of a dog a solution of lactic acid, containing ten per cent. of the acid, seems to show that *lactic acid*, when absorbed into the blood, will cause endocarditis.

In about twelve hours after the operation, the symptoms and physical signs of endocarditis appeared. Richardson regarded his experiment as proving synthetically that rheumatic endocarditis is produced by a similar agent. In rheumatism the morbid conditions are supposed to be caused by the presence of *lactic acid* in the blood.

PATHOLOGICAL RESULTS OF ENDOCARDITIS.

Endocarditis may give rise to immediate pathological results which are important, namely: emboli, or plugs, consisting of detached vegetations, or excrescences, which, propelled with the current of blood into the arteries, are at length arrested in their course in trunks too small to permit their further progress, giving rise to arterial obstruction and diminished supply of blood to certain parts. For a further consideration of this subject, see *Valvular Lesions*.

"The solidified products in cases of endocarditis, namely: fibrin and lymph, are, to a greater or less extent, disintegrated by the blood-currents, and carried into the circulation, either in solution or suspended in the form of minute particles. It is supposed that the comminuted solid deposits, transported to different organs, and becoming arrested in the capillary vessels, may give rise to vascular obstruction and secondary inflammation in these organs. The kidneys and spleen are most likely to be the seat of disease thus

induced. These effects are primarily mechanical; but it is highly probable that morbid changes in the blood itself are sometimes induced by the admixture of the liquid products of endocardial inflammation. It can hardly be otherwise if, as is not improbable, purulent matter is occasionally formed on excoriated or ulcerated surfaces, which are in some instances observed after death in cases of endocarditis." (Flint.)

The formation of large masses of fibrinous coagula in the cavities of the heart belongs to the immediate pathological effects of endocarditis. It is supposed that these ante-mortem clots are the formations called by the older writers, polypi of the heart.

SYMPTOMS OF ENDOCARDITIS.

The symptoms of endocarditis are less distinctive even than those of pericarditis. Occurring generally in connection with acute rheumatism, its symptomatic indications are merged in those of the latter affection. In a large proportion of cases, there are no symptoms which attract attention to the heart as the seat of any disease. Examination, however, with a view to determine the presence, or otherwise, of phenomena which point to endocarditis, may elicit symptoms which are of importance in the diagnosis. These symptoms consist of pain referable to the heart, symptomatic fever, and excited action of the organ, or palpitation. Symptoms arising from obstruction to the passage of blood through the orifices of the heart, do not belong properly to the symptomatology of endocarditis, but are due either to lesions resulting from endocardial inflammation, or to accidental events, such as the formation of coagula. (Flint.)

Pain is very rarely a prominent symptom, and, as in other serous inflammations, is sometimes altogether absent. Even when it is present it is not easy to refer it to endocarditis, except by taking into account other symptoms, and especially the physical signs. The pain is generally dull and obtuse, rarely sharp or lancinating. A feeling of uneasiness hardly amounting to pain, is sometimes referred to the præcordia. The suffering which patients endure from the pain in

the joints is so much more severe, that they will not be likely to mention the uneasiness in the heart unless you question them closely. If the pain in the region of the heart is so severe and acute as to cause complaint, the probabilities are that pleurisy or pericarditis is present, rather than endocarditis.

The *fever* is not of any importance, for it is not distinctive of this disease.

Palpitation in endocarditis may arise indirectly from excitation of the muscular structure of the heart. The action of the heart may be irregular, as well as unnaturally excited.

The *pulse* may not correspond with the action of the heart, for while the latter may be acting with increased *force*, the pulse may be weak.

If you observe these symptoms occurring during the course of acute rheumatism, you may safely suspect the presence of endocarditis, and you should resort to physical examination without delay.

PHYSICAL SIGNS OF ENDOCARDITIS.

Increased extent and degree of dullness on *percussion*, due to tumefaction of the heart, and accumulation of blood within its cavities, is considered by Bouillard and others as a physical sign of endocarditis. Flint, however, doubts whether the cardiac enlargement often, if ever, exceeds the limit of healthy variations. He thinks if the heart is found enlarged, there must have been a previous hypertrophy. He says, "how far the size of the heart undergoes alterations during the progress of endocarditis, I am unable to say from my own observations, but it is evident that percussion cannot afford very important information with reference to this disease, except in a negative point of view, that is, by aiding in the exclusion of other cardiac affections, more especially pericarditis."

Palpation and *inspection* will furnish evidence of excited action of the heart. The impulse is seen and felt to be more violent than in health, or out of proportion to the amount of febrile movement which exists. But the signs furnished you by these methods of exploration will be of little value

to you except as associated with other evidences of endocardial inflammation.

Auscultation will furnish you with the only positive proof of the existence of endocarditis, and this proof is the development of the endocardial murmur.

This assertion has been substantiated by clinical experience, and you should give particular attention to its study. The murmur is usually soft, having the character of a bellows-sound. It is systolic, for it accompanies the first, or systolic sound of the heart, but you will not find it always at the commencement of the disease. In fact, its existence is considered rare in that stage. I cannot give you any certain data as to the period of inflammation in which this murmur occurs. There are conflicting opinions on this point. The time of its appearance is, however, in the opinion of all authorities, quite *variable*. The endocardial murmur is not, *of itself*, absolute proof of existing endocarditis. Previous valvular lesions may be a cause of the murmur. It occurs in consequence of blood-changes, independently of inflammatory or organic disease of the heart.

Under what circumstances then, you will ask, is the presence of the murmur a diagnostic symptom of endocarditis? If you find an endocardial murmur in connection with symptoms denoting cardiac inflammation, and if acute rheumatism co-exists; and, further, if you have made previous careful explorations, and failed to discover any murmur, you may then conclude that the murmur you have detected is a sign of endocarditis. If, however, the murmur is discovered on *first* examination the symptom is of doubtful value.

A murmur developed by endocarditis generally continues not only throughout the duration of the disease, but even afterward. There seem to be some exceptions to this rule, for Flint says he has repeatedly known a *mitral* murmur to disappear entirely after recovery from rheumatism, when it was very marked during the disease. This could only occur in those rare cases in which the swelling of the valves diminishes, and the vegetations are detached and washed away, leaving the endocardial surface smooth.

I need not inform you of the *cause* of the murmurs alluded to. It is doubtless due to a roughness of the endocardial membrane covering the valves, produced by the lymph, fibrin, and vegetations; although some authors have conjectured that the murmurs were due to a spasmodic action of the papillary muscles, preventing the mitral valve from fulfilling its function—allowing regurgitation to take place.

The *heart-sounds* may be abnormally modified during endocarditis. Reduplications have been observed. The first sound, and sometimes the second, may be less distinct than in health, or the first sound may be wanting.

DIAGNOSIS.

You will find that the diagnosis of endocarditis does not depend upon symptoms, but almost entirely on evidence developed by auscultation. Those of you who attempt to rely upon symptoms alone will necessarily overlook this important disease, and allow your patients to lose the aid which might be afforded in the prevention of organic disease. Never neglect this in cases of acute rheumatism. Examine your patient every day, and be on the watch for the *endocardial murmur*, which is the only sure evidence of this disease.

But, as I stated a few moments ago, you cannot give a positive opinion unless you have been watching for this murmur at a time before it existed, for if you heard it at the first examination, it may have previously existed from some valvular lesion of long standing. You will readily deduce from this caution, that it will be very difficult, if not impossible, for you to detect endocarditis in a patient who has any organic disease of the heart.

As idiopathic endocarditis is the rarest of all diseases of the heart, I will not enter into discussion of its diagnosis. I must inform you, however, that pericarditis is so often associated with endocarditis, that you will rarely find the latter free from the former. In the diagnosis of endopericarditis, you will have to compare the signs of both:

but, happily, the treatment of these affections is not materially different.

PROGNOSIS.

The prognosis of endocarditis is generally favorable, so far as any immediate danger to life is concerned. The symptoms may continue, and the condition become chronic, and cause great inconvenience, and exist for a long period. Chronic endocarditis may be suspected if the patient continues to complain of uneasiness in the heart, and that organ continues unnaturally excited. But this disease, when chronic, so nearly simulates valvular disease, that the prognosis depends on the extent of the structural lesion.

Certain accidental events may occur during endocarditis which may seriously endanger life, namely: the formation of fibrinous coagula; the detachment of vegetations or of masses of fibrin or lymph, constituting emboli; the admixture of disintegrated solid deposits; and purulent infection of the blood.

If we can judge of the prognosis from recorded clinical experiences, we can believe that, in a large majority of cases of endocarditis, recovery takes place without serious accidents. The cardiac symptoms gradually disappear. The patient, however, is generally left exposed to the evils arising from valvular disease, which may become developed at a period more or less remote, unless your treatment has prevented such a result.

TREATMENT OF ENDOCARDITIS.

The treatment of endocarditis cannot be disposed of so summarily as some authors have done, by asserting that there is "no essential difference" in the treatment of endocarditis and pericarditis. Not only is the treatment not the same, but the objects of treatment are dissimilar. Flint very tersely observes, that in pericarditis the compression of the heart by the accumulation of liquid within the pericardial sac is a source of distress and danger; and to prevent this accumulation, and promote its removal, are important

therapeutical ends. In endocarditis, however, the action of the heart is free from all mechanical restraint. In pericarditis the inflammation is more generally diffused, and a greater effect is produced upon the muscular walls, first by excitation, and afterwards by paralysis. In endocarditis the inflammation is seated especially in the membrane connected with the valves and orifices, when it is not in contact with the muscular walls, and the latter are consequently affected in a less degree. In pericarditis the aim of the practitioner is often to avert impending death. In endocarditis there is little fear of a fatal result.

But although the two affections are so dissimilar in many respects, the general principles of management are in a great measure alike applicable to both.

The therapeutical indications in the treatment of endocarditis relate mainly to the alterations to which the membrane is exposed, and to the products of inflammation.

Your objects must be to diminish as much as possible the local effects of the inflammation; then to aid in restoration from these effects, and thus protect the organ from the remote consequences arising from incurable and progressive unsoundness. In other words, you must accomplish, if possible, the following results:

1. Abate the intensity of the inflammation.
2. Abridge its duration.
3. Limit the exudation of lymph.
4. Diminish the precipitation of fibrin.
5. Effect the removal of solid deposits.

The remedies to which you must resort to gain these ends are, mainly: *aconite*, *veratrum viride*, *digitalis*, *arsenicum*, *spigelia*, *phosphorus*, *colchicum*, *bryonia*, *asclepias*, *lachesis*, *naja*, *sulphur*, *belladonna*, *rhus*.

Aconite is useful in the first stage of the disease, when the pulse is hard, small, and quick, and there is pain of a sharp, pricking description in the cardiac region, with anxiety, fear of death, faintness, oppression, and tumultuous action of the heart, (see also "*Aconite*" in Pericarditis.)

Veratrum viride you will find useful in those cases which are ushered in by a more violent congestion, pain, and intense

force of the circulation. The bounding pulse—full, hard, and quick; the intense throbbing headache, *without delirium*, will indicate this remedy, in the lowest dilutions. With these two agents, aided by a low diet and absolute rest, you will be able to abate the inflammation and shorten its duration. But the disease is often so rapid in its course, that you will be obliged to anticipate the second stage, and alternate with the above:

Bryonia, if the pains are of the severe *stitching* character peculiar to the medicine. This remedy is powerful against the exudation of lymph, and is equally useful in endocarditis as in pericarditis.

Asclepias tuberosa, as I remarked when speaking of pericarditis, has nearly the same sphere of action as *bryonia*.

Colchicum is probably more suitable to pericarditis than endocarditis. I am of opinion, however, that it is not so much the local condition that indicates this remedy, as the condition of the blood. *Colchicum* causes an extraordinary increase in the secretion of uric acid, and it is this which makes it such an invaluable remedy in cardiac affections occurring during attacks of gout. It is, however, equally useful in rheumatic endocarditis.

Belladonna is an excellent remedy in endocarditis, especially when there is secondary irritation and congestion of the brain, and also where there occurs congestion of the chest. It is best indicated when the first is passing into the second stage, and we have the following symptoms: aching in the cardiac region, taking one's breath away and causing anxiety; occasional intermittence of the pulse; irregular, unequal contractions of the heart; throbbing pain beneath the sternum, near the epigastrium; violent heart-throbbing, with jarring of the head and neck.

Digitalis, from the very nature of its action, cannot prove of much value in endocarditis, unless it be associated with pericarditis. As Baehr very properly remarks, "In endocarditis it seems almost impossible to indicate special heart-symptoms requiring the use of *digitalis;* in such cases, the constitutional symptoms will have to determine our choice." However, as endocarditis rarely occurs unattended by some pericardial inflammation, *digitalis* should always be thought

of, and selected according to the indications given under pericarditis.

Arsenicum will not control acute endocarditis, but will be found useful in those severe paroxysms of palpitation, or the attacks of cardiac syncope, which sometimes occur. It will be most indicated if Bright's disease or pyæmia be the cause of the endocardial inflammation.

In direct contradiction to Baehr, Dr. C. Müller asserts that "*Arsenic* has been found serviceable in palpitations, carditis, endocarditis, rheumatic, and organic diseases, especially of the left side of the heart," and he adds that "*Arsenic* possesses the most perfect specific and homœopathic relation to endocarditis. It is indicated not only in the commencement of the disease, but also when exudations and vegetations have formed on the endocardium and valves, especially of the left ventricle. It is hence the main remedy in Bouilland's so-called chronic endocarditis. It is indicated when the following physical signs are present: dullness over a greater extent than usual in the cardiac region, especially in a vertical direction; violent and irregular action of the heart, with feebleness or almost complete extinction of pulse; indistinctness, or roughness, of both sounds of the heart, or a bellows-murmur with the first sound, heard on the left ventricle and along the aorta, but loudest over the aortic valves, viz., at the edge of the third rib, near the left edge of the sternum."

Spigelia, according to Baehr, is only useful in incipient endocarditis, or to endocarditis generally before marked valvular changes have taken place. For the special indications for *spigelia*, I refer you to your notes on pericarditis, and the remarks I shall make in the future consideration of valvular diseases.

Phosphorus will undoubtedly be of use to you in some cases of endocarditis. I can do no better than to give you the indications pointed out by Baehr, which I consider reliable. He says "*Phosphorus* is clearly suitable for inflammation of the endocardium and the muscular tissue, never for pericarditis. The constitutional symptoms would lead us to recommend *phosphorus* in endocarditis associated with pneumonia, against the cardiac inflammation, not

against the pneumonia, for we have already stated that when pneumonia is complicated with cardiac inflammation, the presence of the latter constitutes an absolute obstacle to the absorption of the pneumonic exudation. In the next place, *phosphorus* takes the precedence over every other medicine in cardiac inflammation, when occurring as complications of such processes as lead us to infer a dissolution of the blood, like scurvy, puerperal fever, malignant exanthematous diseases, typhus, etc. Finally, we possess few remedies that embody in their pathogeneses as plain a picture of nephritic and cardiac inflammation as *phosphorus.*"

Baehr is of opinion that we have often cured cardiac inflammations with *phosphorus* without knowing it. In the conclusion of his observations he says, "Finally, we have to point out a symptom which most decidedly indicates phosphorus, we mean the dilatation which develops itself during endocardial inflammation with such surprising rapidity."

I will add that *phosphorus* appears to be pathologically indicated in this disease. The *post-mortem* appearances observed after poisoning by *phosphorus* are: the muscular tissue is flabby and easily torn; opaque appearance and intersticial distension of the endocardium; bloody infiltration, which in certain circumscribed spots penetrates the whole thickness of the muscular tissue. If, in addition to these appearances, we consider the very feeble, small, and exceedingly frequent pulse; the frequent observation that the sounds of the heart either often disappear or are replaced by murmurs, we cannot deny that this remedy ought to be tried in severe cases, especially those of a secondary character.

Lachesis, as well as all the serpent-poisons, exerts a profound and specific action on the heart, and more upon the endocardium than the pericardium. In all cases we find an unusual increase of the frequency of the pulse, which becomes feeble and small, or intermittent; there is pain in the region of the heart, the pain being sometimes intense; palpitation of the heart; fearful anguish; bloody expectoration, with constant hacking cough; marked symptoms of cyanosis; icy coldness of the extremities, with cold perspira-

tion; paralytic sensation in the whole left side of the body, or a violent pain in the left shoulder and left arm. In my opinion, *lachesis* (also *crotalus* and *naja*) is indicated in the second and third stages of very acute and severe cases of endocarditis, when arising from pyæmia, typhus, or during malignant eruptive fevers. It is homœopathic to the vegetations and structural changes which occur, for *post-mortem* examinations after death from serpent-poisoning have always shown the heart more or less affected. The endocardium in the region of the valves is infiltrated and easily torn; ecchymoses cover its internal and external surfaces; and exudations occur in the muscular tissues of the heart. Take these indications, together with the many symptoms recorded in our *materia medica*, and you will have no difficulty in selecting *lachesis*. *Dose:* the dilutions from 6th to 30th.

Iodine and its combinations should not be neglected by you in endocarditis. They are indicated in sub-acute cases, and not so much for the inflammation as for the structural changes occurring on the valves.

Cuprum aceticum has been reported by a Dr. Kissell* as having cured three cases of rheumatic endocarditis, but the testimony is based on the observation that "Auscultation revealed a bellows-sound at every other beat of the heart; feeble pulsation of the heart." The symptoms of the heart were: "pressure under the lower part of the sternum, and oppression of the chest; pulse, 85; quick pulsation of the heart, and the tone feeble and dull, as if it came from great depth."

Dose: the tincture, or 3rd to 6th triturations.

Apocynum androsemifolium. In endocarditis-rheumatica, when the rheumatic affection has been confined to the hands and feet, and there is present considerable gastric and hepatic irritation.†

Dose: the first dilution has been found most useful.

Asclepias syriaca, as you will observe from the provings, will likely prove of service in endocarditis from renal affections, or from a retention of scarlatinal poison.

Dose: the tincture, a few drops, in water.

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* Marcy and Hunt's Practice. † New Remedies, 2nd Ed.

Baptisia will prove in your hands an unrivalled remedy in endocarditis during or following typhoid or other low fevers, especially when you have present its well known characterstic symptoms.

Dose: the first decimal dilution, in drop doses.

Cactus grandiflorus will never fail you, in the severest cases of the acute form, if that peculiar symptom, "Sensation of constriction of the heart, as if from a band around it, preventing movement," is present. No other remedy equals it in controlling the severe nervous palpitations common to the disease. I get the best effects from the 1st dil.

Cimicifuga must not be forgotten in the treatment of endocarditis rheumatica. It may be better suited to pericarditis, but if the former affection have a rheumatic origin, I see no reason why this remedy should be neglected. If the endocardial inflammation occur in a woman from suppression of the menses, and there is also intense headache, delirium, stitching pain in the region of the heart, in the infra mammary region, and down the left arm, you can give the *cimicifuga* with every prospect of success.

Dose: the dilutions below the 4th.

Hamamelis. I have reason to believe that in certain cases of phlebitis, the inflammation may be transferred or extend to the heart. If such a condition does occur, this remedy will be found useful. In the provings we find it to cause pricking pain in the region of the heart, felt also in the superficial veins of both arms, continuing for ten days. By referring to the provings you will find other important symptoms of cardiac inflammation. This medicine acts best in the lowest dilutions.

Lachnanthes will have to be used if cerebral symptoms occur, which indicate its use. The cardiac symptoms of this remedy are also notable.

Lobelia inflata has been used successfully in some cases of endocarditis. The characteristic symptoms calling for its administration are very striking: excessive vomiting; an intense sensation of sinking at the stomach; sighing; great dyspnœa; deep seated pain in the region of the heart; and small, quick, and feeble pulse.

Dose: the dilutions from 1st to 6th.

Phytolacca may prove useful in sub-acute or chronic endocarditis if the patient has rheumatic symptoms, and the cardiac pain extends to the *right* shoulder and arm instead of the *left.*

Sanguinaria. The sphere of action of this medicine resembles that of *phosphorus*, in so far as the complication of endocarditis with pneumonia may occur. If you meet this complication in practice, do not forget to study the provings of *sanguinaria*, for you may find it indicated when *phosphorus* or *sulphur* have been used without the expected curative results. If the *right* lung is the seat of the inflammation, it is to be selected instead of *phosphorus.*

You will remember that in my lecture on pericarditis I mentioned the efficacy of the alkaline treatment, as a means of combatting the existing pathologico-chemical cause of rheumatism. The same observations will apply to that treatment in endocarditis. It may also prevent the formation of the solid products incident to the latter, by depriving the blood, to a certain extent, of its excess of fibrin. The *carbonate of ammonia* has been highly recommended for this purpose, as being more powerful than other alkalies, and it is affirmed that its use will prevent the formation of large fibrinous coagula.

The indications during convalescence and subsequently are: to advise against undue exercise, the abuse of stimulants, the avoidance of agitating emotions, and excesses of any kind, which might bring back the inflammation, or hasten the development of structural lesions. But you must not go so far as to alarm your patient to exceeding caution, for an extreme sedentary life should be equally avoided. An amount of physical activity necessary to vigorous health is not unfavorable as regards the liability to organic disease. You must not excite the fears of your patient, for the moral effect of looking forward to probable organic disease is not favorable to mental or bodily health.

MYOCARDITIS.

A brief allusion to myocarditis will close this lecture. This is an inflammation of the muscular structure of the

heart. The muscular substance of the heart is the seat of inflammation much less frequently than the investing and lining membranes of the organ. It rarely, if ever, occurs independently of endo- and peri-carditis. Either the investing or lining membranes, or both, are implicated. The inflammation, probably, in most instances extends from these membranes to the muscular substance. Theoretically, it ought to occur more frequently as a complication of muscular than synovial rheumatism. Practically, however, we do not know that this is the case. The inflammation is usually limited to certain portions of the heart, and it occurs much oftener in the left than in the right ventricle. It may be confined to the outer or inner layers of muscular fibres; or it may extend throughout the walls and affect the *columnæ carnæ*. The septum is less likely to be affected than the ventricular walls. The results of myocarditis are *suppuration*, *induration*, and *aneurismal dilatation*. Rupture of the heart may also occur.

Where abscesses exist, there is purulent infiltration of the surrounding parts. The formation of abscesses destroys the muscular structure to a great extent. They may discharge their contents into the pericardial sac, giving rise to acute pericarditis; or they may evacuate into the ventricular cavity, and give rise to purulent infection of the blood. In either case a fatal result is inevitable.

The *diagnosis* of myocarditis is nearly impossible. There are no symptoms or signs which can warrant a positive opinion.

The *treatment* does not differ materially from that advised in the former diseases. I will suggest, however, that where there is reason to suspect myocarditis, *aconite*, *bryonia*, *belladonna*, *cimicifuga*, and other medicines having a special affinity for muscular structure, would be chiefly indicated.

PART III.

ORGANIC DISEASES OF THE HEART

LECTURE VII.

GENTLEMEN: You have followed me with excellent attention through the lectures on Functional and Inflammatory Diseases of the Heart. It is now my duty to give you the history and treatment of those diseases of the heart which are termed *structural*, for the reason that they all present some lesion which changes its normal structure, and I will commence with the various forms of

HYPERTROPHY.

Definition and Varieties of Hypertrophy — Enlargement by Hypertrophy — Concentric Hypertrophy — Symptoms and Pathological Effects — Physical Signs and Diagnosis of Enlargement by Hypertrophy — Summary of the Physical Signs of Hypertrophy with Enlargement of the Heart—Treatment.

Enlargement of the heart is a term which embraces abnormal increase of this organ, as regards either volume or weight, or, as is commonly the case, increase both in weight and volume. Increase of the volume of the heart, and increase of its weight, are different forms of enlargement, either of which, although they are usually associated, may exist independently of the other. The heart may exceed the limit of health as regards weight, from an increased thickness of its walls, the normal volume being retained. This is a condition sometimes found after death, although in the vast majority of the cases in which the weight is augmented the volume exceeds the healthy limit.

On the other hand, the volume of the heart may be abnormally great, the cavities being enlarged, while the thickness of the walls is so far diminished that the normal weight is retained. The latter form of enlargement is also of very rare occurrence, the organ generally increasing in weight when its volume is greater than in health. Abnormal increase of the heart in weight, due to morbid thickness of the muscular walls of the organ, constitutes the morbid

condition called Hypertrophy. Abnormal increase of the heart in volume, due to the morbid size of its cavities, constitutes the morbid condition called Pilatation. These names, hypertrophy and dilatation, thus denote different forms of enlargement of the heart, which exist sometimes separately, but usually together. Hypertrophy and dilatation have been subdivided by writers into several varieties, the subdivisions being based on well-marked distinctions.

First. Hypertrophy exists, in some cases, without any alteration of the cavities, the latter remaining normal. This has been called pure or simple hypertrophy.

Second. The cavities are sometimes found to be diminished in size below the limit of health. This has generally been admitted as a variety of hypertrophy, although its existence, as a morbid condition, is open to doubt. It has been distinguished as concentric hypertrophy, or hypertrophy with contraction.

Third. The variety occurring much more frequently than the others is characterized by the co-existence of dilatation to a greater or less extent.

This variety has been called eccentric hypertrophy, or hypertrophy with dilatation. Dilatation, on the other hand, differs in different cases, according to the thickness of the walls of the heart.

First. It exists in some cases, the walls retaining their normal thickness. This has been called pure, or simple dilatation. It is obvious, however, that in proportion to the dilatation, the heart is hypertrophied, assuming the walls to preserve their normal thickness, inasmuch as the quantity of muscular structure and the weight of the organ, under these circumstances, must be increased.

Second. In other cases, in which the capacity of the cavities is increased, the thickness of the walls is diminished. In this variety, the weight of the heart may not exceed, and may even fall below, that of health. This has been distinguished as dilatation with attenuated walls, or attenuated dilatation.

Third. The variety of dilatation which occurs with far greater frequency than either of the other varieties, is characterized by increased thickness of the walls, or well-

marked hypertrophy, the dilatation, however, being predominant. These subdivisions, although based on distinctions which are valid, are embarrassing to the student. They are consistent with the different morbid conditions of the heart, as determined by examinations after death; but they are not accompanied by diagnostic criteria, by means of which they may be discriminated at the bedside during life. A simpler arrangement is clinically more available, and suffices for all practical purposes.

We may distribute all cases of enlargement of the heart into two groups: 1st, Enlargement by hypertrophy; and, 2nd, Enlargement by dilatation. These groups will include, respectively, cases in which the hypertrophy or the dilatation is either simple or predominant.

In cases of enlargement by hypertrophy, the cavities may, or may not, exceed their normal capacity. Cases in which the cavities are diminished will also fall in this class. If the hypertrophy be neither simple nor concentric, it is included in this class whenever it is greater than the co-existing dilatation. The symptoms and signs enable the diagnostician to determine, often with positiveness, the existence of hypertrophy, which may be either simple, or predominant over a co-existing dilatation; but to discriminate between the cases in which the hypertrophy is simple, and those in which it predominates over co-existing dilation, is a problem in diagnosis by no means easily solved.

So, in cases of enlargement by dilatation, the quantity of muscular structure may, or may not, exceed the limit of health. The diagnostic criteria of predominant dilatation are often sufficiently positive; but it is far less easy to decide whether the dilatation be accompanied with hypertrophy or attenuation. Moreover, as regards prognosis and treatment, after the existence and degree of enlargement are ascertained, it is enough to determine which form of enlargement predominates, namely, either hypertrophy or dilatation.

ENLARGEMENT BY HYPERTROPHY.

Under this head, it is to be borne in mind, I include, not only enlargement due exclusively to increased thickness of the muscular walls, but enlargement by hypertrophy with dilatation, provided the former predominate over the latter. In examining the heart, after laying open the cavities and removing their contents, the predominance of either hypertrophy or dilatation is generally obvious to the eye. The two forms of enlargement are combined, in different cases, in every degree of relative proportion.

In determining, then, whether the enlargement be by hypertrophy or by dilatation, the question is, which contributes most to the morbid size, increase of the structure, or increased capacity of the cavities. Instances, however, occur in which these two forms of enlargement are about evenly balanced. On measuring and weighing the heart, the excess of weight is greater than the abnormal dimensions, in proportion as hypertrophy preponderates.

The walls are more solid and resisting. The ventricles retain their rounded form when the heart is placed on its posterior surface, not being flattened by the collapse of the ventricular walls. If the increased thickness of the walls of the ventricles be due purely to hypertrophy, they present externally, and on section, the appearances of healthy muscular structure, and the microscope shows the characters of the normal tissue; the hypertrophy, causing abnormal volume and weight, is due to increase of the muscular substance.

The heart may be more or less enlarged by an accumulation of fat upon the surface and between the muscular fibres, or by the presence of different morbid products in these situations. Under these circumstances, notwithstanding the abnormal volume and weight, the muscular substance may be diminished; that is, instead of hypertrophy, there is atrophy of the heart.

The several portions of the heart may collectively participate in the enlargement, or it may be confined to one or more of the anatomical divisions, without extending to the whole organ. In the majority of cases, all portions are

involved, but they are rarely affected equally; the enlargement is more marked in some divisions than in others. The different portions may predominate in one part and dilatation in another. If the enlargement be limited to, or be seated chiefly in, the left ventricle, the vertical is more increased than the transverse diameter; the heart is elongated, and the conoidal form may be more marked than in health. If the enlargement be great, the right appears to be merely an appendix of the left ventricle. The apex is lowered, and is more or less removed to the left of its normal situation.

On the other hand, if the enlargement be limited to, or be seated chiefly in the right ventricle, the width, more than the length, is increased; the conoidal form is less marked than in health; and the apex, formed in part or entirely by the right ventricle, is blunt instead of pointed. The apex extends lower than in health, and more in a direction toward the epigastrium than when the enlargement is seated in the left ventricle. If both ventricles be considerably enlarged, the organ has a globular form. The papillary muscles are not infrequently more or less increased in size when the ventricular walls are thickened. The degree of hypertrophy varies greatly in different cases. The thickness of the left ventricle may be increased to an inch, an inch and a half, and even two inches. The walls of the other compartments may, in like manner, be doubled, tripled, and quadrupled. The vertical and transverse dimensions may be five or six inches, or more. The weight may exceed two, three, four, and even more than five times the normal average.

Is enlargement by hypertrophy due to an increase in size of the muscular fires, or does it involve an abnormal multiplication of the fibres? If the term hypertrophy be applied exclusively to morbid growth, it implies that the enlargement is due to the former, that is, to an increase in size of the muscular fibres. The term is thus restricted by Virchow and others. The multiplication of fibres, on the other hand, is called hyperplasia, or hypergenesis. Measurements in normal hearts, and in hearts more or less hypertrophied, show an increase of size of the muscular fibres, their diameter in the latter sometimes being four times greater than in the former. The heart may, therefore, be enlarged so that

the volume will be four times greater than in health, by hypertrophy, in the restriction sense of the term. This, however, will probably not account for the increase of the muscular substance in all cases; and, if not, the multiplication of fibres must be admitted. Enlargement of the heart by hypertrophy, therefore, may be due wholly to hypernutrition, or increased growth of the muscular fibres, and hyperplasia may be superadded.

What causes the pathological processes, namely, hypernutrition and hyperplasia, which increase the quantity of the muscular substance of the heart?

Generally, if not invariably, enlargement by hypertrophy is the result of prolonged abnormal force of the heart's action. It is difficult to account for this form of enlargement, except as caused by augmented muscular power continued for a long period; and generally there are present obvious causes which account, in this way, for the enlargement. The mechanism is the same as in the familiar examples of certain voluntary muscles becoming disproportionately developed when inordinately exercised. The muscles of the arms of the blacksmith are strikingly in contrast with the muscles of the lower limbs; and the reverse is true of pedestrians and dancers. Involuntary muscles, aside from the heart, also present examples. For instance, the muscular structure of the urinary bladder may become enormously hypertrophied, when the power of contraction of this organ has been for a long time increased in consequence of obstruction to the expulsion of the urine. Clinical observation shows, that in most cases of enlargement of the heart by hypertrophy, there are prior morbid conditions which stand to it in a causative relation. The practical bearing of this pathological view of hypertrophy is vastly important. It follows, that enlargement of the heart by hypertrophy, as a rule, is compensatory; or, in other words, a conservative provision to meet the difficulties incident to the morbid conditions upon which the hypertrophy depends. This truth cannot be too strongly impressed.

In the great majority of cases, enlargement by hypertrophy is consecutive to, and dependent upon, morbid conditions

within the heart, namely, on valvular lesions. These give rise to hypertrophy when they involve over-repletion of the cavities, in consequence either of obstruction to the free passage of the blood through the orifices, or of regurgitation due to valvular insufficiency. The organ being unduly distended and stimulated by the accumulation of blood, its action becomes abnormally forcible; the causes of accumulation being permanent, and often progressively increasing, the increased power of action continues and augments, and hypertrophy is the result. The hypertrophy commences in that portion of the heart which is primarily affected, but the several portions sustain to each other, in their anatomical structure and functions, relations so close and reciprocal, that causes which at first are limited to one portion, affect, ultimately, the whole organ. The enlargement, however, preponderates in the portion which is first affected.

Directing attention, with some detail, to the mode in which valvular lesions give rise to enlargement, we shall be led to consider the development of the affection in the different anatomical divisions of the heart, respectively, taking them up in the order of their greater relative liability to become hypertrophied.

Of the several portions, the left ventricle is oftenest enlarged; next in liability to enlargement, is the left auricle; next, the right ventricle; and, last, the right auricle.

The valvular lesions which especially lead to hypertrophy of the left ventricle, are seated at the aortic orifice. Lesions in this situation may involve, as will be seen hereafter, either contraction, and consequently obstruction; or incompetence of the valves, and consequent regurgitation of the blood from the aorta into the ventricular cavity.

Obstruction seated in the aorta, either near to or at some distance from the heart, such as is incident to aortic aneurism, may lead to hypertrophy of the left ventricle primarily, and subsequently of the other portions. Enlargement commences in the left ventricle, in connection with lesions affecting the mitral orifice and valves, and involving either contraction or insufficiency, or both these immediate effects.

Contraction and valvular insufficiency at the orifice of the pulmonary artery occasion, primarily, enlargement of the right ventricle, precisely as aortic lesions induce, first, enlargement of the left ventricle.

Lesions at the tricuspid orifice being extremely infrequent, enlargement of the right auricle rarely occurs, except consecutively to an affection of the right ventricle.

Enlargement of the heart, not associated with valvular lesions, may be due to obstruction at a distance from the centre of the circulation. Obstruction to the pulmonary circulation incident especially to emphysema of the lungs, and occasionally to chronic pleurisy, collapse, and dilated bronchi, leads to enlargement.

The researches of Larcher, Ducrest, and others, show that a certain amount of hypertrophy, limited to the left ventricle, is incident to pregnancy. It would seem that the hypertrophy, under these circumstances, is to be regarded as normal, and that it disappears after confinement.

The changes which occur in the muscular structure of the uterus, in connection with gestation, are thus represented, on a small scale, in the heart. The increase in weight of the heart in pregnancy, it is estimated, may amount to one-fifth of the previous weight of the organ. Doubtless this temporary hypertrophy is compensatory or conservative, as it is when it occurs in other connections.

It was formerly supposed, that the prolonged functional disorder of the heart frequently eventuated in the development of hypertrophy. This supposition does not derive much support from clinical experience. At first view, the statement just made may appear inconsistent with the fact that the abnormal growth of the muscular walls of the heart is the result of abnormal muscular action of the organ. The inconsistency disappears when it is considered that functional palpitation, even when intense, does not involve the increase of power or strength of muscular action which is incident to the over-accumulation of blood from an impediment to the circulation.

(See "Functional Disorders," page 50, where this opinion is controverted. *Hale.*)

Enlargement by hypertrophy, as already stated, is almost always a secondary affection. In the great majority of cases it is consecutive to valvular or aortic lesions. It is also an effect of certain chronic pulmonary diseases, more especially emphysema of the lungs. It occurs in certain cases of Bright's disease. It is a physiological event in pregnancy. It may be produced—but the examples are very rare—by long-persisting functional disorder. Its occurrence, when it is not evidently a secondary affection, is so infrequent, that there is room for doubting whether it ever be a truly idiopathic affection. (Flint.)

SYMPTOMS AND PATHOLOGICAL EFFECTS OF HYPERTROPHY.

The symptoms of hypertrophy, in the cases which come under the cognizance of the physician, are generally intermingled with those of concomitant cardiac or other affections, of which the hypertrophy is an effect. Cases of hypertrophy not associated with, and dependent upon, other affections, are so rare, that its clinical history cannot be said to have been established by observation. The symptomatic phenomena which are described as distinctive of it, are determined inferentially, rather than by facts observed in well-authenticated cases. Rationally considered, it is clear that the symptoms would be those indicative of abnormal power of the heart's action. Undue determination of blood to the head might be expected to occasion certain phenomena, such as cephalalgia, flushing of the face, throbbing, epistaxis, vertigo, etc. These symptoms have relation especially to hypertrophy affecting the left ventricle. Assuming the absence of aortic and of mitral lesions involving obstruction or regurgitation, the pulse would represent by its force, fullness, and incompressibility, the power of the ventricular systole. Dyspnœa, when, from any cause, the action of the heart is increased, as, for example, after exercise, would denote that the hypertrophy affected the right ventricle. Of the powerful action of the heart the patient would be conscious when his attention was directed to it, and it would be apparent from the movements of parts of the body and the dress. The digestive and assimilative functions would not

be expected to offer any marked symptoms of disorder. The muscular strength would not be diminished; nutrition would not be impaired; nor the functions of secretion and excretion interrupted. (Flint.)

Hypertrophy of the heart, not consecutive to either alvular or aortic lesions, and not an effect of either emphysema or any other pulmonary disease, constitutes always presumptive evidence of the existence of renal disease.

SUMMARY OF THE PHYSICAL SIGNS OF ENLARGEMENT OF THE HEART.

I cannot do better, in order to bring to your observation in a practical way, the prominent physical signs of enlargement, than to quote from Flint on Diseases of the Heart.

1. Percussion.—The area of the superficial cardiac region extended beyond the range of healthy variation. The degree of dullness within this area greater than in health, and the sense of resistance more marked. The limits of the deep cardiac region—in other words, the boundaries of the heart—generally defined by careful percussion; the dimensions of the space which the heart occupies being thus ascertained with precision, and the form of the organ delineated on the chest. Enlargement of the right or left auricle, sometimes determined by the extent of the area of dullness at the base of the heart, on the right or left side of the sternum.

2. Palpation.—The apex-beat moved to the left of its normal position, and lowered; the extent of variation, in either respect, being proportionate to the degree of enlargement, provided extrinsic causes be excluded. The area within which the apex-beat is felt extended beyond the range of health. Abnormal impulses felt in two, three, or more intercostal spaces, the additional impulses either synchronous or alternating with the apex-beat, in some instances referable to the auricles, although due to the ventricular systole; and, when felt in the epigastrium, due to the action of the right ventricle.

3. Auscultation.—The respiratory murmur not appreciable within the superficial cardiac region in tranquil breathing, and sometimes wanting when the breathing is forced; feeble over a larger area within the præcordia than in health. The boundaries of the heart defined by abrupt cessation or notable diminution of vocal resonance, and the augmented space which the organ occupies, in this way determinable in corroboration of the evidence afforded by percussion.

4. Inspection.—Abnormal projection of the præcordial region in some cases; the projection considerable if the enlargement take place in early life. The movements of impulsion determined, which are also ascertained by palpation; movements sometimes seen which are not perceptible to the touch, especially movements which commence by depression with the systole of the ventricles. Alternate movements of intercostal spaces often apparent to the eye, which are imperfectly ascertained by palpation.

5. Mensuration.—Prominence of the præcordia greater than the corresponding portion of the chest on the right side; in some cases apparent on inspection, but determined with precision by diametrical measurement. Mensuration also employed in determining with accuracy the dimensions of the superficial and deep cardiac regions, the position of the apex-beat relatively to the nipple, median line, etc.

SUMMARY OF PHYSICAL SIGNS DISTINCTIVE OF ENLARGEMENT BY HYPERTROPHY.

1. *Palpation.*—Abnormal force of the apex-beat, denoting not merely excited action of the heart, but augmented power of the systole of the left ventricle, the impulsion prolonged and strong. A strong impulse in the epigastrium in cases of hypertrophy of the right ventricle; the impulsions sometimes communicated to the lower part of the sternum, and extending more or less over the site of the liver. A strong, heaving movement of the præcordia, in distinction from the shock, more or less violent, due merely to augmented functional activity of the ventricles.

2. *Auscultation.*—Increased intensity of the aortic second sound, and especially of the element of impulsion of the first sound, in hypertrophy of the left ventricle, rendering the first sound dull and prolonged, as well as abnormally intense, Exaggerated intensity of the pulmonary second sound, in hypertrophy of the right ventricle, especially if associated with obstruction to the pulmonary circulation. Augmentation of the tricuspid valvular element of the first sound in some cases of hypertrophy of the right ventricle.

TREATMENT.

The treatment of hypertrophy of the heart, *i. e.*, enlargement by hypertrophy, by the allopathic school, presents some of the strongest arguments against the wilful bigotry of that school, and their persistence in adhering to a routine treatment, even when the facts of pathology are against them.

Up to a recent date, the allopathic treatment universally adopted, was equalled only by that of Dr. Sangrado, as depicted in Gil Blas. Repeated venesections; a diet so low as to result in partial starvation, was insisted on, not only by Vausalva and Albertini, but more recently, by Hope, Bouillard, and even Wood.

I do not know of any disease where the results of such treatment could be more destructive to the integrity of the general system, for by it the heart was weakened, and *dilatation* — a condition ten-fold worse than *enlargement* — was generally caused.

The very *object* of the allopathic treatment was an error. A diminution of the *size* of the heart was considered a desirable result, but, as Flint observes, "A better understanding of the pathological relations of hypertrophy leads to the conclusion, that therapeutical measures designed to diminish or prevent it, are likely to do harm, in so far as they have efficiency in promoting these ends."

I am sorry to inform you, that the homœopathic treatment of hypertrophy of the heart has been as erroneous in principle, although the results have not been nearly as disastrous as those produced by the opposite school. The

same remedies, in the same potency, have been used for the two opposite conditions of enlargement and dilatation. Even Baehr, otherwise sound, gives no separate and distinctive treatment for the two diseases.

I propose to present you with the treatment of *enlargement by hypertrophy*, and in a future lecture give you the true treatment of *dilatation*.

At present, the best authorities of both schools agree on one vital point, namely, that, considered in connection with the antecedent morbid conditions which give rise to it, conditions involving impediment to the circulation, hypertrophy, so far from being an evil, is an important provision against the dangers incident to the accumulation of blood within the cavities of the heart, and against the evils of dilatation. Hypertrophy compensates for the disturbance of the circulation caused by valvular lesions, and so long as the enlargement consists of this compensating increase of muscular structure, and consequently of muscular power, the patient experiences little or no inconvenience, providing nothing occurs, like anæmia, for example, to weaken the force of the heart's action. It is when hypertrophy has reached the limit of its progress, and dilatation has followed, that serious inconveniences, referable to the heart and circulation, begin to be felt.

The general indications for treatment which I will now give for your adoption are:

1. To prevent those impediments to the circulation, arising generally from valvular lesions, which give rise to hypertrophy.
2. To prevent dilatation, by keeping up, if possible, the normal tonicity of the muscular structure of the heart.
3. To quiet undue excitement and irregular action of the heart.

The rules in relation to the general management of the patient are so uniformly agreed upon by all writers, that nothing original can be said. Baehr and Flint, the two representative authorities, have nearly the same views.

It is obvious that all influences that might stimulate the already over-excited heart should be avoided. Coffee, spirits,

strong spices, salt in excess, also fat food, should be avoided. Mental excitement, especially anger, should be guarded against by the patient.

Very large and hearty meals should be avoided; small and frequent meals should be advised, and on no account should heavy meals late at night be allowed. The occupation of the patient may sometimes be changed to advantage. A sedentary life, attended by much excitement of mind, should be changed to a more active one, with less mental irritation. As regards exercise, your own judgment will have to be depended on. In some cases, general exercise, unless moderate, must be prohibited; in others, the physical activity may be greater. Local coldness of the hands and feet must be met with such gymnastics as exercise the extremities alone, the body being quiet.

The circulation should be equalized as much as possible; especially should remote parts of the body be supplied with blood, in order that the heart may not be overburdened and excited. The extremities should be warmly clad, and the whole body protected by flannel underclothing.

All influences tending to debility, nervous prostration, anæmia, or blood-impoverishment, should be avoided. Remember that the main object of treatment is to prevent *weakness* of the heart. Losses of the fluids of the body in excess tend to such weakness. Excessive venery, undue lactation, diarrhœa, purgation, a too meagre diet, and the improper use of medicines, should be guarded against. Mental depression will have the same unhappy result, and you should strive to have your patients placed under those influences which conduce to a happy, pleasant state of mind.

The medicines indicated for hypertrophy with enlargement are best presented in four classes, arranged according to their peculiar spheres of action, thus:

I. Those medicines whose primary effect in large doses is to depress the action of the heart and weaken its muscular power, namely:

Aconite, gelseminum, veratrum viride, veratrum album, kalmia, tartar emetic, colchicum, sanguinaria, lobelia, and tabacum.

II. Medicines whose primary effect is to increase the

strength of the muscular power of the heart, by stimulating its nervous life; and whose secondary effect is to depress and paralyze the nervous and muscular power of that organ. Among the most prominent of this class are:

Digitalis, *cactus*, *lilium*, *hydrocyanic acid*, *prunus virginiana*, *amygdalus*, *and A. amara*, *persica*, *lycopus virginica*, and *laurocerasus*.

III. Remedies which primarily tend to increase the nervous power and nutrition of the heart; and secondarily, to weaken and paralyze the same cardiac functions, namely:

Nux vomica, *ignatia*, *hydrastis*, *collinsonia*, *cinchona*, *ferrum*, *cimicifuga*, *helonias*, *phosphorus*, and *sulphuric acid.*

IV. Certain antipsoric or alterative remedies, whose effects cannot be classified into primary and secondary sequences, namely:

Spigelia, *rhus*, *iodine*, *graphites*, *natrum mur.*, *bismuth*, *lycopodium*, and *sulphur.*

INDICATIONS FOR THE REMEDIES IN CLASS I.

In selecting a remedy for the symptomatic or pathological results of this form of enlargement, you should first assure yourself that the *force* of the heart is actually increased. Remember that the heart may be in excessive *action*, without having increased *force.*

If the hypertrophy occur in robust, strong, full-blooded persons, with bright complexion, disposition to changes of color of the face, glistening eyes, injected conjunctiva, headache, stinging pains in the region of the heart, *aconite* is the remedy, and should be given in the lowest dilutions, and frequently repeated, until an amelioration occurs, when the medicine should be withdrawn. Remember that these symptoms are like the *secondary* effects of *aconite*, and this obliges us to prescribe it in more material doses. All of Class I. follow this law, and if indicated by the increased *force* of the heart's action, and the general symptoms correspond, the dose should be the same as *aconite.*

Veratrum viride is indicated by the more forcible impulse of the heart, the stronger pulse, and the greater congestion of the head and chest.

Gelseminum, by the same symptoms, but in a less degree,

and an apparent torpor of the functions of the brain and lungs, and a less active congestion.

Veratrum album, according to Ch. Muller, causes "Extreme agony, which takes away the breath; palpitations, with anxiety, and quick audible respirations; paroxysms of agony about the heart, which beats very violently, and feels as if it were too warm; violent beating of the heart, which forces up the ribs; the heart beats up very high and forcibly, so as to force the hand away, without pain." He remarks that "the entire absence of pain about the heart, while it beats so violently as to shake the chest, elevate the ribs, and lift the hand of the auscultator, deserves particular attention, for this almost never occurs, except in hypertrophy with dilatation." (?) (He should have said with *enlargement*, for in dilatation no such forcible impulse is present.)

"*Physical signs.*" The percussion sound may be dull over a very large space, (the apex of the heart may beat directly beneath, outside of, or above the nipple,) bulging of the ribs over the heart; action of the heart visibly very violent; sounds of the heart very loud and clear, or else one or both sounds accompanied with abnormal murmurs."

If *veratrum alb.* causes this array of symptoms—and it appears to me that the primary and secondary are mixed in the above—the increased impulse or force of the heart's action must be a secondary effect, for the immediate effects of *white hellebore* are marked depression of the heart's action, even to pulselessness. If this medicine is given for concentric hypertrophy, it must be given in the same doses as advised for *aconite* and others of its class.

Kalmia may be useful in certain cases, but the indications are not yet certain.

Tartar emetic should be resorted to if pulmonary engorgement is feared, and there is at the same time hepatic congestion, dyspnœa, cough, etc.

Colchicum, if the urine is scanty, red, and deposits a brick-dust sediment, and the heart's action is excessive and strong.

Sanguinaria will prove a potent remedy if the hypertrophy is complicated with suppressed or scanty menses, congestion

of the lungs, cough, dyspnœa, and sometimes congestive cephalalgia.

Lobelia should not be forgotten when there are *asthmatic* symptoms with the enlargement.

Tabacum is secondarily homœopathic to hypertrophy, and Baehr advises smoking small cigarettes for palliative relief of the excessive palpitations. If they are marked by increased impulse, tobacco may be used occasionally; if the impulse is weak it should be prohibited.

In regard to the administration of these remedies, I wish to impress upon your minds this important fact, namely, that if you wish to get *permanent* curative effects from any remedy in hypertrophy, you must continue its use for days and even weeks. If you have selected *aconite* as the appropriate medicine, do not supplant it for some other in a few days because you do not see an improvement in the action of the heart. Our doses do not rapidly depress the excessive cardiac action, therefore the physiological or normal action which we wish to induce does not come suddenly.

As a general rule, the remedies above named may be given every three or six hours, according to the severity of the case, and always in the lowest potencies, and sometimes the mother tincture.

INDICATIONS FOR THE MEDICINES IN CLASS II.

Of all the medicines in this class, the *digitalis purpurea* is the most important, but even to this day its true method of action is not understood by a portion of the profession, who persist in believing it to be a primarily depressing medicine. Those of you who have read my paper on *digitalis*, published in the *United States Medical and Surgical Journal*, and reprinted in pamphlet form, need not be told that many years ago I adopted the views of Prof. Tully, who was far ahead of his time in his estimate of some medicines. Within a few years, Handfield Jones, Hammond, and others have adopted the same view of its action.

Digitalis, when given in medicinal doses, causes pathogenetically a condition similar in effect to hypertrophy with enlargement of the heart. It does not cause actual enlarge-

ment, but such a hyper-stimulation of the heart that the results are similar.

When death occurs from acute poisoning by *digitalis*, the muscular substance is hard and firm; the heart is rigidly contracted, and no blood is found in its cavities. Now, if death should suddenly occur from concentric hypertrophy or enlargement, the heart would be found in the same condition as in *digitalis*-poisoning.

It is obvious that if we accept this as the true action of *digitalis*, namely, that it is, in large doses, a cardiac tonic, you can readily understand how injurious, and even dangerous, it would be to give large doses in hypertrophy with enlargement, *i. e.*, when the heart has already an excess of muscular power. It is in such cases that, when given by the old school, dangerous and alarming symptoms occurred, which led to the fears of its use which we find so prevalent. It is as if an allopath were to give a massive dose of *belladonna* in a case of cerebritis, or *nux vomica* in spinal congestion, or *arsenic* in gastritis. In such cases, the remedy being intensely homœopathic, a severe or fatal aggravation would occur.

The deduction I would have you draw from this is, that as *digitalis* is primarily and intensely homœopathic to a condition similar to hypertrophy with enlargement, in which the contractile power and impulsive force of the heart is increased, it should be prescribed in the smallest dose consistent with reason. I will explain what I mean: the 3rd of *digitalis* may not be *stronger* in reality than the 30th of *lycopodium*, for while the former appears to lose its medicinal power after the 3rd, the latter seems to gain in power at every remove upwards from the 3rd trituration. This difference is due to the fact that certain medicines have different qualities of inherent power; and, in the future, it should be the aim of our school to ascertain the inherent medicinal power of each drug, instead of quarreling about the dose.

The dose of *digitalis*, then, in this disease, should lie in the first three dilutions of the tincture, or the triturations of *digitaline* from the 3rd to the 6th. With these doses, repeated every few hours, or as often as every hour, no aggravation, but much benefit, will be derived.

Cactus grandiflorus is an analogue of *digitalis*, and not of *aconite*, as some suppose. If you will look at the provings you will see that the evident primary symptoms are those of hyper-stimulation of the heart, even to spasmodic contraction of its muscular tissues. What else can that characteristic symptom, "constriction in the chest and in the heart, as if from an iron hand," mean? The general symptoms of *cactus* all tend in this direction, for it causes 'constriction' everywhere. I have carefully analyzed the clinical cases wherein *cactus* has proved curative, and am convinced that in those cases where the high dilutions were beneficial, there was present a condition of increased tonicity of the heart; in other words, the palpitations and so-called congestions of the heart were due to cardiac hyper-stimulation. In cases of true hypertrophy, then, do not use *cactus* lower than the 6th decimal dilution. Lower than this I have found it to aggravate all cases where the impulse of the heart was *too strong*.

Lilium is, according to its recent provings, a very near analogue of *cactus*.

Acidum hydrocyanicum is another remedy closely allied to *digitalis*. In proof of this, I have but to cite you to Dr. Handfield Jones' experiments. He says, "In poisonous doses it produces tetanic convulsions, preceded by faintness and giddiness. After death the heart is well and firmly contracted, its tissue remarkably firm, the cavity of the left ventricle almost quite obliterated, that of right small, but little blood in either, coagula in both auricles." Stille says, "the whole venous system is gorged and distended with dark uncoagulated blood," which implies that, owing to the tetanic contractions of the heart, the circulation was suspended. I consider this remedy useful in high potencies to quell the excessively forcible action, pain like angina pectoris, and for other symptoms found in its pathogenesis. Use the 6th or 30th centennial dilution.

There are many agents, chemical and vegetable, which contain *hydrocyanic acid* in appreciable quantities. These all have, in a less degree, the same specific action on the heart and its nervous supply. The most potent of these is the

Cyanide of potassium, which may be used in the 6th or 30th potency for similar symptoms and conditions.

Laurocerasus is another which possesses many notable and important heart symptoms.

Prunus virginiana (wild cherry) and *amygdalus persica* (peach) both contain *acidum hydrocyanicum*, and have long been used to quiet and regulate abnormal action of the heart. Their use, in infusion of the bark, has doubtless been injurious in hypertrophy with enlargement, but in the 2nd or 3rd dilution would no doubt be beneficial.

*Lycopus virginicus** possesses powers closely allied to the above medicines. In the dilutions below the 3rd you will find it beneficial in hypertrophy with a tendency to, or actual hæmoptysis and cough.

Amygdala amara (bitter almonds) contain *hydrocyanic acid.* I have known patients troubled with palpitations from hypertrophy get considerable relief from eating two or three after each meal.

Repetition of medicines. If you have carefully selected one of the above for the case you are treating, give it a fair trial. Do not change the medicine unless the symptoms materially change, but continue its use for days and perhaps weeks. The repetition of the dose will depend on the amount of cardiac disturbance. Four doses a day, unless frequent palpitations or severe congestions occur, in which cases the medicine may be repeated every hour or two.

The remedies of the third class, namely: *nux vomica*, *ignatia*, *cinchona*, *ferrum*, *hydrastis*, *collinsonia*, and *sulphuric acid*, do not differ very widely, in their ultimate effects on the heart, from those of Class II. Both classes primarily increase the innervation and tonicity of the heart, by acting through different channels. *Nux vomica* acts through the cerebro-spinal nerve-centres, while *digitalis* operates through the great sympathetic.

I will now give you the indications for this class:

Nux vomica, I assure you, has not been sufficiently appreciated in hypertrophy of the heart. It is indicated in

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* New Remedies. 2nd Edition.

the concentric and eccentric form. But it is of the former only that I will now speak.

Dr. Ch. Müller* says of this medicine, "It causes palpitation in frequent short paroxysms, with commotion of blood; pulsating throbs in the direction of the heart; great anxiety, with severe palpitation. In the numerous and careful *post-mortem* examinations which have been made in cases of poisoning with *nux*, no organic alterations about the heart have been found. Its influence on the heart must be referred to the nervous system. It causes increased activity and evident irritation of the ganglionic system, which may be propagated to the mind and senses; hence the above-mentioned heart-symptoms may arise in consequence of sympathy with the ganglionic and mental affections. For this reason Hahnemann laid so much stress on the presence of vexability, over-sensitiveness to all impressions, hypochondriacal humor, passionate irritability and sudden choler, great anxiousness, starting in affright, fearful, anxious dreams, etc., as strong indications for the use of *nux vomica*. Hence, *nux* cannot prove homœopathic to any heart affection dependent upon any organic or material change of structure."

I cannot agree with Dr. Müller in his estimate of this medicine. Because no structural change was found in the heart from acute nux-poisoning, it does not prove that hypertrophy may not be caused by its long-continued pathogenetic effects. You will remember that hypertrophy is rarely a primary disease. It is generally brought on from obstructions somewhere else, in the circulation, or in important organs. That the chronic poisonous effects of *nux vomica* on the liver, intestinal canal, and spinal cord, will cause hypertrophy, I have no doubt. It will not cause, directly, the thickening or thinning of the heart-walls, but it will cause disorders which lead to that result.

The translator of Dr. Müller's paper says, "*Nux vomica* acts predominantly and specifically on the motor side of the spinal marrow and the muscular system in general, and tends more particularly to cause tetanic spasms; as the heart

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* Homœopathic Examiner, Vol. V.

is a very muscular organ it is probable that it exerts a similar action on it; in fact, the spasm of the heart may become so complete and persistent, that this organ remains tightly contracted for some time, during which little or no impulse is felt, the respiration being difficult and the pulse extinct. If the spasm of the heart be less complete and tonic, *i. e.*, more atonic, then violent palpitation may ensue. But *nux vomica* constantly tends to produce long-continued spasmodic contraction of the heart. According to Sorbenheim it often causes an asphyxiated condition, dependent upon an extremely violent contraction of the respiratory muscles and heart. Every one familiar with diseases of the heart must be familiar with this state of things: a patient with organic disease of the heart will be suddenly taken with what he calls spasms; he sits in speechless agony, his hands clasped over the cardiac region, his eyes protruded, his face livid; the physician attempts to feel the pulse and can scarcely find it; he places his hand or ear over the heart, and finds everything still and motionless as death itself; after a while the spasm relaxes; more or less palpitation follows, and the patient recovers for the time. Such attacks are often mistaken for paralysis, exhaustion, or debility of the heart, and treated with stimulants."

This writer asserts that *nux* is homœopathic to enlargement of the heart with thickening of its walls, which assertion I accept, but only as relates to its primary effect, for the secondary effects of the above-described action of *nux* will just as certainly be dilatation of the heart, with atony of its remaining muscular fibres, even to paralysis.

You will doubtless read some authorities, who, like the writer I have quoted, will assert that the action of *digitalis* is opposite to that of *nux*. This is not the case, unless the statement is qualified. The primary action of both is very similar, so is the resulting secondary effect. It might be said that the secondary effect of *digitalis* was the opposite of the primary action of *nux; such* an assertion would be correct.

Nux vomica, therefore, is indicated for simple hypertrophy, *i. e.*, when the walls of the heart are thickened, the cavity retaining its natural dimensions; also in that variety of

hypertrophy in which the walls are considerably thickened, and the cavity dilated; and in hypertrophy with contraction, in which the walls are thickened and the cavity diminished in size. But, before you venture to prescribe *nux vomica*, be sure of your diagnosis, for if you give it in too large doses in the above conditions, you will surely get severe aggravations, and injure your patient, because they are conditions simulating the primary effects of *nux*, and calling for the highest attenuations, namely, from the 12th to the 200th, or even higher.

Ignatia is indicated for the same pathological conditions as *nux vomica*, but the selection must depend on the mental symptoms and the sex of the patient. *Ignatia* is more suited to women, or men with feminine dispositions, to patients who weep easily, or laugh and cry alternately; in other words, persons of hysterical temperament; and for hypertrophy when caused by the remote effects of grief, care, or other mental trouble. Prescribe the higher attenuations, not too often repeated. (*Nux* and *ignatia* are also homœopathic to hypertrophy with dilatation and attenuation of the heart-walls, but of this I will speak in my next lecture.)

China, or *cinchona*, has not been used by the homœopathic school to any extent in diseases of the heart, yet I consider its action analogous to that of *digitalis* and *nux*, or as holding an intermediate relation to them. Hahnemann's observation that in cases of poisoning from *digitalis*, *china* causes terrible anxiety and aggravation, is one of the best proofs that, in their primary action on the heart, they act similarly.

The following symptoms from the Materia Medica Pura will remind you of the symptoms of *nux* and *digitalis*:

"Palpitation of the heart, also with rush of blood to the head, and heat and redness of the face, with cold hands."

"Strong, violent beats of the heart, also with anxiety, also with feeble pulse and cold skin."

"Pressure in the region of the chest (heart), particularly when the trunk is bent forward, when sitting or standing, also with anguish and oppression of breathing."

In the proving of *quinine* you will find similar symptoms, to which I add the following: "distressing constriction about the throat, and sense of *fear* about the heart;" and, if you

should happen to practice in malarious districts, where people are poisoned with *quinine*, you will have excellent opportunities of observing its effects, namely: its primary symptoms, like those I have just quoted, denoting over-stimulation of the heart; and its secondary effects, namely, weakness, irritability, and irregular action of the heart. I have no hesitation in asserting, that many of the cases of hypertrophic debility of the heart, supposed to arise from ague, have their origin in the enormous quantities of *quinine* given to suppress that disease.

I believe, also, that the free use of *quinine* will cause hypertrophy with enlargement, of a *temporary* character, and as a large proportion of the cases of dilatation of the heart is preceded by this condition, we have in *quinine* a medicine which is homœopathic to that variety of cardiac disease. I shall refer to china again in the next lecture.

Dose: In hypertrophy with enlargement, having the above symptoms, give the 6th or 30th dilution.

Ferrum has an action not so far removed from *nux* and *china* as some have supposed. All the preparations of iron cause pathogenetically a pseudo-plethora, *i. e.*, a plethora not of a healthy physiological character. I do not look upon iron merely as a blood-enricher, acting in the same way as beef or other blood-food. To suppose that it acts simply by imparting *iron* to the blood is too crude a notion. The more rational theory is that it has a two-fold action, namely, of entering the blood and then stimulating the nerves of nutrition until the blood-making process goes on in a normal manner. This ferrum-plethora closely simulates that condition which we sometimes see in cases of hypertrophy with enlargement. The *symptoms* indicating its use are: Rush of blood to the head, with puffiness around the eyes and swelling of the veins; vertigo, staggering, hammering and throbbing headache, and roaring in the head; faint feeling in walking, with blackness before the eyes; hard, strong beating of the heart; pulse hard, large, and slow, or quickened by exertion; heat, with anxiety and oppression, proceeding from the pit of the stomach; tightness in the chest, as if constricted, with difficult, anxious breathing,

and contractive spasm of the heart. For these symptoms give *ferrum*, but not lower than the 6th trituration.

Hydrastis has no special heart-symptoms, but I recommend it, on theoretical grounds, when the hypertrophy is impending from obstructions in the liver, or chronic stagnation of the portal circulation. *Podophyllum*,* *leptandra*, *æsculus*, and *collinsonia* have the same action, and are especially indicated if the patient is subject to hæmorrhoids, and when the cardiac symptoms are worse when the piles are least troublesome.

The medicines of the *fourth* class, namely: *belladonna*, *glonoine*, *lachnanthes*, *stramonium*, *agaricus*, *cimicifuga*, *aurum*, and *solanum*† are all excellent palliatives in hypertrophy, when the impulse is so strong as to throw an undue amount of blood to the head and lungs, causing headache, vertigo, frightful dreams, etc. They have the best effects in the 3rd to 6th dilution.

Plumbum aceticum, according to Raue, is homœopathic to true hypertrophy with the symptoms: "Stitch in the region of the heart during inspiration, with anxiety; heat and redness of the face; rush of blood to the region of the heart during a rapid walk; anguish about the heart, with cold sweat; palpitation. *Post-mortem* after poisoning has shown, that the serous coat of the pericardium is lined with a layer of reddish grey, fine, villous, meshy, firm, exuded lymph. *The heart is more than double its natural size. The wall of the left ventricle is more than an inch thick.*" ‡

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* See Symptoms of *Podoph.* in New Remedies.

† U. S. Jour. of Hom., 1870.

‡ Raue's Pathology.

LECTURE VIII.

ENLARGEMENT BY DILATATION.

Definition of Enlargement by Dilatation — Symptoms — Pathological Effects — Physical Signs and Diagnosis — Summary — Treatment.

GENTLEMEN: In this lecture, a condition of the heart nearly the opposite of that described in the last, namely, enlargement by dilatation, will be considered. I shall quote entire Flint's admirable description, because no words of mine could make it plainer. The treatment, however, is purely homœopathic — not theoretical, but based on experience.

"Under this head are embraced, in addition to the rare cases of pure or simple dilatation, that is, those in which the capacity of the cavities is increased and the walls attenuated, all cases in which dilatation co-exists with, but predominates over hypertrophy. Of the two kinds of enlargement, this is by far the most frequently found after death when organic disease of the heart proves fatal. In the cases in which the heart attains to a very large size, dilatation almost invariably preponderates. The cases in which the organ, from its immense bulk, resembles a bullock's heart (*cor bovinum*) are those in which there exists great hypertrophy, with still greater dilatation. The degree of dilatation varies greatly in different cases, and the hypertrophy combined with it is also variable. The preponderance of dilatation, when the heart is examined after death, is generally sufficiently evident on inspection. The abnormal increase in the dimensions of the organ exceeds that of the weight. The ventricular walls collapse, and the organ, resting on its posterior surface, is flattened, instead of preserving a globular form, as when hypertrophy predominates. The greater increase in width than in length, is marked in proportion

to the preponderance of dilatation. Owing to this, the organ becomes wedge-shaped, and sometimes presents nearly a square form.

"The mechanism of dilatation is quite different from that of hypertrophy. In the production of the latter the process is vital, whereas in the former it is mechanical. Hypertrophy is a consequence of over-nutrition; dilatation is the result of the yielding of the walls of the heart to a distending force, the condition, however, which stands immediately in a causative relation to both is the same, viz., undue accumulation of blood within the cavities of the heart; hence it is that both take place either conjointly or in succession, so that hypertrophy and dilatation are very often associated. Dilatation, thus, not less than hypertrophy, depends on antecedent affections which occasion impediment to the circulation through the vessels or the orifices of the heart, leading to over-accumulation of blood within the cavities. These antecedent affections are the same as in cases of predominant hypertrophy; and the several portions of the heart become affected singly and in succession, as in the latter form of enlargement. It is not necessary, therefore, in this connection, to consider the dilatation of these portions, respectively, in relation to the particular lesions of the valves and orifices and vessels on which dilatation and hypertrophy alike depend. Moreover, both dilatation and hypertrophy of the different portions of the heart will be referred to hereafter in treating of valvular lesions. It will suffice to inquire into the circumstances which determine the occurrence of dilatation in the place of, or, as is generally the case, in addition to, hypertrophy.

"The first effect of an undue accumulation of blood in the cavities of the heart, continued for a sufficient period, is increased power of muscular action and consequent hypertrophy in the great majority of cases. The hypertrophy is more or less progressive, but it has its limit. The abnormal growth of the muscular tissue ceases after it has progressed to a certain extent. But the morbid conditions inducing over-repletion of the cavities still remain, impeding more and more the circulation. The compensating increase of the muscular tissue no longer taking place, the walls of the

cavities yield to the mechanical force of distension, and the progressive enlargement from this time onward is due to dilatation. The limit of hypertrophic enlargement varies in different persons. If the hypertrophy progress until the muscular walls attain to a great thickness, and life continue for a long period afterward, dilatation finally predominates, and the result is an enormous enlargement of the heart, a *cor bovinum*. But dilatation may commence after moderate or slight hypertrophy has taken place; in other words, the hypertrophy ceases after a smaller amount of muscular growth, and dilatation commences. Dilatation may even commence without any previous hypertrophy, and the result is, then, enlargement with attenuated walls, or simple dilatation, a rare variety of enlargement of the heart. The occurrence of dilatation is determined by the state of the muscular walls. Functional debility of the organ, and, still more, changes in the muscular fibres, prevent that vigorous activity which induces abnormal growth; and yielding of the walls takes place early, in proportion as the vital power of resistance is impaired. Anæmia, the feebleness consequent on pericarditis and adherent pericardium, fatty degeneration, softening, and any changes which compromise the muscular power of the organ, tend to abridge hypertrophy and favor dilatation. The latter will therefore predominate in proportion as the condition of the walls is such that they early and readily yield to the distension caused by the accumulation of blood within the cavities. After this brief consideration of the circumstances determining the occurrence of dilatation, in addition to the incidental remarks already made under the head of enlargement by hypertrophy, the reader will be able to trace the relations of dilatation affecting the different cavities of the heart, to lesions of the mitral and the aortic orifice, involving either obstruction or regurgitation, or both, and to obstructions affecting the pulmonary and systemic arterial systems at situations more or less remote from the heart, without recapitulation of the account already given in connection with hypertrophy. The inquiry arises, Does not the heart, in some instances, become dilated in consequence of inherent weakness, no antecedent affections existing to occasion impediment to the circulation? It

is probable that this sometimes occurs as an effect of fatty degeneration, pericardial adhesions, atrophy or softening of the muscular fibres, etc. Examples are found of dilatation associated with these structural changes, and without other obvious sources of impediment to the circulation. These changes may be subsequent to dilatation, but it is reasonable to suppose that in some instances they precede and give rise to it. Clinical observation, however, furnishes no evidence that functional weakness alone leads to dilatation, irrespective of structural changes of the walls of the heart, or lesions of some kind which occasion impediment to the circulation. Dr. W. T. Gairdner accounts for dilatation of the heart in cases of pulmonary emphysema, in the same way that he accounts for emphysema, namely, the cavities of the heart are dilated by the force of inspiration, as are the unobstructed air-cells in consequence of collapse of more or less of the pulmonary lobules. This author accounts in this way for, not only dilatation, but hypertrophy, the expansion of the thorax tending constantly to overload the heart, and thus occasioning increased muscular force. Without adopting this explanation, it must be admitted that Dr. Gairdner bases his explanation on facts which have considerable weight. "Of 24 cases of enlargement without valvular lesions, in 21 cases there were manifest and extensive old atrophic lesions of the lungs, with or without accompanying emphysema, which is recorded as having existed in 17 of the cases." Dr. Gairdner also shows, by an analysis of fatal cases, that enlargement of the heart occurs oftener in emphysematous cases than in mixed cases, the proportion being as 15 to 23 per cent.; and that, of the cases occurring with emphysema, valvular lesions are present in a less proportion than in the mixed cases, the whole number of cases analyzed being 84. To show that contraction of the capillaries of the lungs from any cause, or obstructed circulation through these organs, will not give rise to enlargement of the heart, he analyzes 18 cases, in which effusion into the pleuræ or peritoneum, or other causes, occasioned compression of the lungs for a considerable time, there being no valvular lesions. In only four of these cases did enlargement exist, and in one case its existence was doubtful. On these data

he bases the conclusion, that, while diseases of the lungs which merely obstruct or obliterate the circulation in the capillaries, have no well-marked tendency to be associated with enlargement of the heart, those which produce atrophy of the pulmonary tissue, and secondarily emphysema, have an obvious influence on the heart, and frequently cause its enlargement.

SYMPTOMS AND PATHOLOGICAL EFFECTS OF DILATATION.

"The *symptoms* due to dilatation, like those of hypertrophy, are generally involved with those incident to valvular or other concomitant lesions. In proportion to the amount of dilatation, the muscular power of the heart is impaired. The symptoms distinctive of dilatation proceed from feebleness and incompleteness of the heart's action. The action of the heart is often irregular, as represented by irregularity of the pulse and of the apex-beats. Both are abnormally feeble. The pulse may be unequal as well as irregular. These symptoms are in relation to dilatation of the left ventricle. The patient experiences more or less uneasiness and undefinable distress, referable to the præcordia, but he is not conscious of that powerful action of the heart which characterizes hypertrophy. The extremities and surface of the body are cool. Lividity may be apparent on the prolabia, the tongue, face, and extremities. The veins, especially those of the neck, may be distended. These symptoms are more or less marked, in proportion as the dilatation affects the right ventricle. Dyspnœa will be prominent in proportion as the right ventricle is the seat of dilatation. The recumbent posture, with the head low, may be insupportable, and, in an advanced stage, the suffering from defective hæmatosis may amount to orthopnœa. Occurring in paroxysms, this difficulty of respiration has been called cardiac asthma. Exercise and mental excitement augment the symptoms, particularly the dyspnœa. More or less cough is usually present, with serous and sometimes sanguinolent expectoration. The abdominal viscera, as well as the lungs, are in a state of passive congestion. Owing to this state, the liver may become more or less enlarged, and may be

found to augment rapidly in size when, from any cause, the circulation is temporarily embarrassed in an unusual degree, resuming its former dimensions when the paroxysm ends and the heart recovers its habitual strength.* The digestive functions are weakened, but nutrition may be sufficiently active; patients do not always emaciate. The urine is not abundant, and may be found slightly albuminous, which is due to renal congestion, and is not necessarily indicative of structural disease of the kidneys. Renal disease is, however, associated, in a certain proportion of cases, with dilatation as with hypertrophy. Finally, œdema occurs, first manifested in the lower extremities, thence extending over the body, and effusion into the serous cavities succeeds, constituting general dropsy.

"This is an enumeration of the more important of the symptoms belonging to cases of enlargement in which dilatation predominates, but it is to be borne in mind that, in general, valvular or other lesions co-exist, which, after inducing more or less hypertrophy, have at length led to dilatation; and, under these circumstances, it is difficult to say to what extent the symptoms distinctive of this stage of the disease may not be due to the causes of the dilatation, in other words, to the concomitant lesions. But it is certain that much, if not chief importance is to be attached to the dilatation in the production of the symptomatic phenomena which have been mentioned.

"The *pathological effects* of dilatation are, in a great measure, embraced in the foregoing account of the symptoms. The dilatation is the result of weakness of the cardiac walls, together with an accumulation of blood within the cavities; and, on the other hand, it is the cause of further diminution of the power of the heart's action, and consequent over-repletion. It has, therefore, an intrinsic tendency to increase. The evils incident to enlargement are mostly referable to dilatation. Little or no inconvenience is felt so long as the heart is hypertrophied, and the capacity of its cavities not increased. But in proportion as the latter takes place, the quantity of blood to be propelled from the cavities is greater,

* Stokes on the Heart and Aorta.

and the ability of the muscular walls to contract sufficiently is lessened; hence, inadequacy of the motive power of the central organ to carry on the circulation. This inadequacy increases in more than an arithmetical ratio as the dilatation progresses. The immediate effect on the vascular system is passive congestion, arising, not alone from the defective propelling power of the heart, but from the obstacle presented to the return of blood to this organ by the accumulation within its cavities. The ulterior effects dependent on congestion are: embarrassment of the functions of the important organs of the body; serous transudation, or dropsy; and, occasionally, hæmorrhage. An occasional effect of great dilatation, conjoined with extreme feebleness of the heart's action, is the formation of coagula within the cavities of the heart. There is reason to believe, that in some instances in which the accumulation is excessive, and the contraction of the walls extremely feeble, the blood coagulates during life, and proves the immediate cause of a fatal termination. An unusual accumulation of blood, from any cause, in either the right or the left ventricle, when it is much weakened by dilatation, may occasion paralysis of the walls by distension, and thus produce sudden death.

PHYSICAL SIGNS DISTINCTIVE OF ENLARGEMENT BY DILATATION.

"The physical signs of enlargement of the heart have been already fully considered. The signs distinctive of dilatation are now to be noticed. The several methods of exploration which furnish evidence of enlargement, contribute signs pointing to dilatation in distinction from hypertrophy. The evidence obtained from percussion relates to the form of the area of deep dullness. If the boundaries of the heart be delineated on the chest by means of percussion, the transverse dimension of the area exceeds the vertical in proportion as dilatation predominates over hypertrophy. This corresponds to the difference as regards the form of the heart, which has been stated. The outline which the heart presents is wedge-shaped or nearly square if the dilatation be excessive. Palpation furnishes negative characters more readily available and striking. The powerful apex-beat of

hypertrophy is wanting; also the elevation of the ribs and the heaving of the præcordia. The impulse of the apex is feeble, and may be suppressed. The movements of the organ, owing to the extended space in which it is in contact with the thoracic walls, are sometimes obscurely felt, and oftener visible in two, three, four, or even more intercostal spaces, which together present an appearance of fluctuation, or, as called by Walshe, quasi undulation. In some cases, in which the thoracic walls are thin, and the intercostal spaces wide, the heart seems to be almost exposed to the vision and touch. Auscultation furnishes certain distinctive points pertaining to the heart-sounds. Both sounds are feeble in comparison with their augmented intensity in cases of hypertrophy, but the first sound is disproportionately weakened. The first sound is also altered in character; it becomes short and valvular, resembling in these respects the second sound. The latter alterations, although distinctive of dilatation as contrasted with hypertrophy, are not peculiar to the former, and their true explanation has not been understood. They are due to the impairment or absence of the element of impulsion in the first sound. This element is deficient or wanting whenever the left ventricle lacks the muscular power necessary for its production. In hypertrophy this element is intensified, owing to the increased force of the ventricular contractions; and in dilatation it is feeble or absent, owing to the feebleness which, at the same time, renders the apex-beat weak or inappreciable. But this element is also impaired or absent when, from other causes than dilatation, the muscular power of the heart is weakened. The intensity of the first sound is diminished disproportionately to that of the second sound, and it is also short and valvular like the second sound, in cases of fatty degeneration, and of softening in typhus fever, and of pericarditis with effusion. The valvular element predominates, or is alone present, in consequence of the feebleness or absence of the element of impulsion. But the intensity of the valvular element is also more or less diminished, in the first place, in consequence of the weakness of the ventricular contractions, and in the second place, because at the time when the ventricular contractions take place, the quantity of blood within

the ventricles is large, causing closure of the auriculo-ventricular valves.

"In the diagnosis of enlargement by dilatation, assuming the fact of enlargement to have been ascertained, symptoms (as distinguished from signs) have considerable weight. Passive congestions, lividity, feeble pulse, and dropsical effusion, in fact, constitute evidence almost, if not quite conclusive. The obstruction due to the valvular lesions which are so generally associated with enlargement, it is true, contributes toward the production of these symptoms; but, as will be seen when valvular lesions are considered, the obstruction due to these rarely, if ever, gives rise to the effects just mentioned until dilatation of the cavities of the heart has taken place. With the aid of the physical signs, the discrimination between predominant dilatation and predominant hypertrophy may generally be made with confidence. The differential diagnosis is of importance with reference to prognosis and treatment. The prospect of life and tolerable health is less in proportion as dilatation predominates, and the management involves attention to incidental events which do not occur as long as hypertrophy predominates. For the convenience of comparison with the physical signs distinctive of hypertrophy (see page 149), the signs distinctive of dilatation are embraced in the following summary:

SUMMARY OF THE PHYSICAL SIGNS DISTINCTIVE OF ENLARGEMENT BY DILATATION.

"1. *Percussion.*—The transverse dimensions of the space occupied by the heart greatly exceeding the vertical, the form of this space corresponding to the wedge-like or square form of the organ when the dilatation is excessive.

"2. *Palpation.*—The apex-beat devoid of abnormal force, and in some instances suppressed. Absence of heaving movement of the ribs and præcordia.

"3. *Auscultation.*—The element of impulsion of the first sound deficient or absent, and the sound short and valvular; in these respects resembling the second sound."

TREATMENT OF DILATATION.

The indications for the treatment of enlargement by dilatation in some respects does not differ from the treatment of predominant hypertrophy. In other and important respects, however, the treatment materially differs.

You cannot remove the impediment to the circulation which co-exists in the great majority of cases, but the effects may be mitigated, if you have your patients avoid the extrinsic causes which excite unduly the action of the heart.

In the dark days of the history of medicine, incalculable evil was done, under the impression that the mass of blood must be diminished. Bloodletting was resorted to, giving temporary relief, but ending most disastrously, by causing anæmia and muscular atony, accompanied with excessive cardiac irritability. The same effect was produced by drenching patients with saline drugs, or the use of exhausting cathartics. When these were abandoned, the allopathic school resorted to large doses of *aconite*, *antimony*, and similar exhausting remedies, which only made the disease worse, by weakening the nervous and muscular power of the heart.

Before speaking of medicinal agents, I will give you the general rules which you should try to make your patients adopt. Excessive muscular exercise, mental excitement, or anything calculated to excite unduly the action of the heart, should be avoided.

The great end of the treatment, remember, is to *increase the muscular power of the heart.* The diet, therefore, should be as highly nutritious as possible, and the quantity of liquid ingesta as small as is compatible with comfort. A diet of solid, easily-digestible, animal food, with a careful admixture of nutritious vegetables, should be advised. At the same time advise the patient to avoid any articles that appear to digest with difficulty.

Indigestion, constipation, hepatic torpor, or inactivity of the lungs, must be removed as soon as discovered, and carefully guarded against. The mental condition of your patient will have much to do with his condition. Depression of spirits tend to aggravate the disease. You must encourage

as much as possible, in order to prevent the gloomy forebodings which annoy and depress. You can do this conscientiously, for in the majority of cases under your care, you can safely encourage hope, not of a complete cure, perhaps, but of tolerable health for an indefinite period. The common notion that disease of the heart ends in sudden death is erroneous, and you should strive by the most positive assurances to remove this idea from the minds of your patients.

The *medicines* most useful in the treatment of dilatation have already been enumerated under the head of Enlargement by Hypertrophy. This, at first thought, may seem strange; but when you remember that all medicines have a double pathogenetic action, you can readily see that they will prove curative in opposite pathological conditions. You will observe this in the provings of all medicines, and also from the fact that a medicine is recommended for constipation and diarrhœa, spasm and paralysis, irritation and torpor.

I will, therefore, recapitulate the same classes I gave you in the previous lecture, but with the apppropriate indications:

Class I. Includes medicines whose primary effect is to depress and weaken the muscular and nervous power of the heart, and give rise to conditions which would tend to cause dilatation; but whose secondary effects are similar to those conditions described in the last lecture.

All the truly representative men of the allopathic and eclectic schools now recognize the fact, that *small doses of depressing medicines act as tonics to the tissues they primarily depress.* In proof of this I refer you to the recent writings of Dr. J. R. Reynolds, Handfield Jones, Trousseau, Brown-Séquard, Flint, Scudder, King, and others. This is an affirmation of the theory promulgated by Hahnemann, and which forms the basis on which rests our important and universal Law of Cure. The Law of Dose, which I have taught you in my lectures when occupying the chair of Materia Medica, is, however, equally important, for without it, the selection of the dose is a matter of great uncertainty.

The medicines of this class, then, which primarily depress

the heart's vitality, are especially indicated in the treatment of *dilatation*, and its co-existing debility of the structure of the heart. They are:

Aconite, *veratrum album*, *veratrum viride*, *gelseminum*, *tartar emetic*, *colchicum*, *lobelia*, and *tabacum*.

While I advised you to use these remedies in the lowest attenuations or mother tincture, in concentric hypertrophy when there is an abnormal increase of power, I now advise you to use these medicines in high attenuations, for the reason heretofore given, that the *smallest possible doses should be given when we are treating symptoms similar to the primary effects of medicines.*

The two most prominent physicians* of the opposite schools *almost* recognize this rule, for they prescribe the above medicines in the following manner, namely, ten or twenty drops of the tincture in four or eight ounces of water; a teaspoonfull every three or four hours.

Leaving you to select each medicine in accordance with its characteristic symptoms, I advise you to give the attenuations from the 3rd to the 3000th. After you have chosen the appropriate remedy, do not change too soon, but continue its use until you are satisfied with the improvement, or are sure it is not causing the wished for amendment.

I am not favorable to the alternation of remedies, as a general practice, but I have so often seen beneficial results follow the alternation of remedies belonging to Class I. with those belonging to Class III., that I have no hesitation in advising the practice.

I will only give a few of the most characteristic symptoms of these medicines:

Aconite: pulse irregular, quick, weak, thready, and small; feeble and incomplete action of the heart; the pulse and heart-beats do not agree; coldness of the extremities, numbness and tingling of the cold extremities; great anxiety and fear of death accompany the attacks of palpitation (dilatation of left ventricle.)

Veratrum album: pulse very small, almost imperceptible; intermittent; heart's action feeble, irritable; palpitations,

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* J. Russell Reynolds and Scudder.

with distressing dyspnœa; cold face, with cold sweat on the face and forehead; cold and livid hands and feet, with tendency to cramps in extremities. No *fear* of death, or great anxiety, as from *aconite*, although the patient may think death is near (dilatation of right ventricle).

Veratrum viride: pulse soft, feeble, but very slow, hesitating, or intermittent; excessive irritability of the heart, so that the slightest motion in bed, or sitting up, causes faintness, vertigo, and blindness; pale face, but not the excessive coldness of *verat. alb.*; indifference, no fear of death.

Gelseminum: pulse soft, slow, almost absent; heart's action very feeble, slow, almost imperceptible; *fear of any movement, lest the heart should stop beating;** veins of the neck distended; extremities not cold, but apparently swollen from venous turgescence, slightly livid; indifference; obtuseness; difficulty of lifting the upper eyelids, dimness of sight; heaviness and weariness of the limbs; palpitations feeble, (dilatation of left ventricle.)

Tartar emetic: pulse small, thready, irregular, feeble; heart's action feeble and irregular; dyspnœa of a very severe character, with cough and frothy expectoration; congestion of the lungs; cannot lie down; enlargement of the liver; jaundice; attacks of vomiting; (dilatation of right ventricle, with cardiac asthma.)

Sanguinaria: for nearly the same symptoms, except that the expectoration is bloody.

Colchicum: pulse and heart's action feeble; urine scanty and albuminous; tendency to dropsy, beginning with œdema of the feet, then extending upward.

Lobelia: pulse small, feeble, and irregular; heart's action irregular and weak, aggravated by the slightest exertion; *distressing sinking sensation at pit of stomach*, attended with agonizing attacks of dyspnœa; anxiety, and fear of death; cold face and extremities; cough, with serous expectoration; (dilatation of right ventricle.)

Tabacum: for nearly the same symptoms as *lobelia*, but with vertigo, and sensation of *shocks in the heart*, with feeble distressing palpitations.

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* A very characteristic symptom, just the opposite of all other medicines.

Class II. contains medicines which act in a manner directly the *reverse* of Class I., *i. e.*, their primary action is *similar* to (not identical with) the secondary effects of the latter. I have explained to you this primary action of *digitalis* and its analogues, and described the condition of the heart from their ultimate primary action. Their secondary effects on the heart are *weakness*, *irritability*, and even *paralysis*. I believe their long-continued pathogenetic effects would result in dilatation of the heart. They are among our very best remedies in that condition; but in order to get prompt, palliative, and curative effects, you will have to give appreciable doses, not going higher than the *third* decimal dilutions, even for infants. You will often get the best effects from the mother tinctures, or the aqueous infusions. These medicines, you will remember, are: *digitalis*, *cactus*, *hydrocyanic acid*, *prunus vir.*, *prunus laurocerasus*, *amygdalus persica*, and *lycopus*.

Digitalis. In the spring of 1867, I read a paper on the action of *digitalis* before the Illinois State Hom. Med. Society, which paper was afterwards published in the third volume of the *United States Medical and Surg. Journal.* To this paper I would refer you if you wish all the necessary proofs as to the *tonic* effects of *digitalis* in cardiac debility. The primary action of *digitalis* is quite transient. For this reason you will find its sphere of action in sthenic diseases much more limited than in the asthenic; in a weak condition of the heart oftener than in inflammations or concentric hypertrophy. It is indicated in all the varieties of hypertrophy with *dilatation*, whatever the cause may be, or any condition of the heart where its muscular power is especially deficient. This is directly contrary to the teachings of nearly all authorities up to a few years ago. Prof. Tully, however, was a notable exception. He boldly placed it among his "*antisbestic*," or exhaustion-opposing medicines, and asserts that he has given it for *years* to the same patient without any other than excellent effects. He used it freely in cases of hypertrophy, but it is evident, from his description, that they were cases of dilatation. Of late years, the best practitioners of the allopathic school use it without fear in cases of dilatation, even in large doses. I will quote to you

from Flint, who is evidently an unbiassed witness. He says, "As a remedy, with reference to irregularity of the heart's action incident to dilatation, *digitalis* often manifests a truly remarkable efficacy. Of the different preparations the tincture is to be preferred, on account of its being more reliable as regards strength. *Digitaline*, however, has still more this advantage, and is perhaps entitled to preference." Alluding to the conflicting opinions relative to its action, he says, "Without discussing these different opinions, it may be assumed that, given in small or moderate doses, for example, from ten to thirty drops of the tincture, it cannot, under any circumstances, have much potency to do harm, and it cannot prove a dangerous remedy. That it renders the action of the heart slower and more regular is undeniable. With reference to these effects, Bouillard calls it "the opium of the heart. That it produces these effects without weakening the heart may be assumed; and clinical observation appears to show that, under its use, the heart, already weakened by dilatation, acts with increased strength. With these views, it is a remedy useful in cases both of hypertrophy and of dilatation." Flint does not say how often his thirty-drop doses should be repeated, but I assure you that if they were repeated every two or three hours in a case of hypertrophy with enlargement, they would cause dangerous cardiac spasms, while in dilatation no such dangerous results would follow, although no such large doses are admissible, except in sudden cardiac syncope, and similar emergencies. I have found that doses of one, two, or five drops of the first dilution, repeated every two or three hours, acted well in children or sensitive adults, but the mother tincture in similar doses may be required. In cases of dilatation, give the *digitalis* until it causes the requisite *slowness*, strength, and regularity, even if you have to increase the dose to Flint's standard to bring about that result.

I do not speak from mere theory in this matter, but from much practical experience, which experience I have found to substantiate my theory of dose.

There is another fact relating to the use of *digitalis* in dilatation. This condition will, as you are aware, cause various pathological conditions in other important organs -

the brain, lungs, liver, and kidneys. Dilatation causes passive congestion, with consequent torpor of function in all these and other organs. Therefore, in cerebral, pulmonary, hepatic, and renal troubles; in vertigo, apoplexy, cough, hæmoptysis, jaundice, enlargement of the liver, dropsy, etc., you should always ascertain if cardiac debility is not at the bottom of the trouble. If you find this to be the case, *digitalis* is the *chief* remedy always. As for *characteristic symptoms* whereby to select this remedy, I must say that they appear to me of less value than a knowledge of *the* pathological condition of the heart and its consequences I have just delineated. If you consult any work for *symptoms* go to the *Symptomen Codex*, but even there you will find the indications unsatisfactory. Neither Lippe nor Gross give any indications of value for *digitalis* in cardiac disease. If I were to name any group of *symptoms* indicating its use in dilatation, these would have the preference: quick, weak, irregular, or intermittent pulse; increased or deficient *action* of the heart, with *deficient force* or impulse; cough, hæmoptysis, jaundice, alternate scanty and profuse urine, sometimes albuminous; œdema of the feet, legs, face, and scrotum, ending in general anasarca; sighing respiration, with sinking, weak feeling at pit of stomach; and sometimes vertigo and amaurosis.

I shall allude to *digitalis* again in the treatment of valvular diseases.

Digitalin is sometimes more efficacious in dilatation than the tincture. I allude to the *digitalin* of Quevenne, the only preparation of any value. It occurs in pale straw-colored scales, or a white powder, and is inodorous and extremely bitter. The triturations should always be made on the centesimal scale. You will get the best effects from the 1st to 3rd triturations, of which a grain may be given every three hours.

Hydrocyanic acid is the nearest analogue of *digitalis*, but it acts with greater intensity and rapidity. The primary action of this poison I have already given you. Its secondary action does not materially differ from that of *digitalis*. After the primary effects have passed away, the heart becomes weak, flaccid, and subject to irregular action and severe

pains, which I think are myalgic. These symptoms make it indicated in dilatation with asthmatic troubles, and attacks of angina pectoris. The provings have "tightness of the chest; feeling of suffocation, with torturing pains in the chest; sticking in left side of chest, and pain and pressure in the region of the heart; irregularity, with feeble beating of the heart." You must be exceedingly cautious in prescribing the dilutions. The 1st decimal dilution cannot be taken in doses of one drop frequently repeated, without causing, in sensitive persons, unpleasant symptoms; but you can put 10 or 15 drops in half a glass of water, of which a teaspoonful may be taken every two or three hours. Its use should be suspended, or the doses given at longer intervals, as soon as the action of the heart becomes stronger and more regular. The 3rd dilution may be given in drop doses. But when this acid is indicated, there are agents which contain it and other additional medicinal constituents, making them of greater value in the treatment of cardiac affections. The best of these is the:

Prunus virginiana (wild cherry) which contains a principle which possesses *tonic* properties, similar to *china* and *hydrastis*. This property is also possessed, in a greater degree, by the *cerasus serotina* (choke cherry).

We have no provings of these remedies, but their successful use for nearly a century, has given us clinical experience sufficient to give us reliable data.

I can give you no better indications than those of *digitalis*, to which can be added "weakness, loss of appetite, *slow digestion*, cough, *tightness and constriction of the chest*, and *a fulness and pressure in the head.*" The symptoms in italics I have often observed to arise from large doses of the infusion of the bark of these trees. You can use a hydro-alcoholic tincture of the fresh bark in drop doses, or the lowest dilutions, or the syrup, or the cold infusion, made by digesting or percolating one ounce of the fresh, or dry inner bark in a quart of water, until it assumes a dark red color. This may be given in table-spoonful or wine-glassful doses, repeated every three or six hours. Those who are sticklers for the high dilutions may object to this method of prescribing a medicine, but I cannot see the necessity of adhering

to any one method of preparing our remedies. If a medicine is homœopathic to the disease, it matters not in what form we give it, if the doses are not large enough to cause pathogenetic symptoms. Your object should be to cure your patient in the quickest manner, regardless of peculiar notions relating to arbitrary pharmaceutical preparations.

The leaves, pits, or inner bark of the *amygdalus persica* (peach) is much stronger in prussic acid, and may be used in infusion or hydro-alcoholic tincture, but in one-half or one-third the quantity recommended for *prunus*.

The *amygdala amara* (bitter almond) is still more powerful. This medicine, as well as the pit of the peach, may be prepared in triturations, and used in the 1st. In cases of hypertrophy with dilatation I have known a few bitter almonds eaten before and after meals prevent the palpitations which are apt to occur after eating.

Lycopus virginicus is likely to prove one of our best remedies in dilatation. If you will refer to the provings and clinical experience recorded in "New Remedies," you will see that its sphere of action is evidently that of a cardiac sedative and tonic. It is useful in dilatation associated with and causing pulmonary troubles, such as congestion, hæmoptysis, cough, and dyspnœa. You can prescribe it in the tincture or lowest dilutions, or an infusion of half an ounce of the leaves to eight ounces of hot water. Of this a teaspoonful may be given every two or four hours.

Ferro-cyanuret of potash has lately been introduced into practice as a remedy for hypertrophy, as well as for functional disorders of the heart. This double salt is of a yellowish color, and quite innocuous when compared with the *cyanide of potash*, with which you should be careful not to confound it.

Dr. Ray, in a recent paper, speaks very highly of its use, and gives several clinical cases in which he prescribed it with excellent results. The symptoms which he removed with it were: *palpitation, ringing in the ears, vertigo, intermittent pulse, waking with a sense of suffocation, palpitation disturbing sleep at night, improvement in the open air.* Some of the cases were doubtless purely functional, others apparently structural.

You will doubtless find it especially useful in those cases

which seem to require *iron* and *digitalis*. This meets the indication for both, and may be given in grain doses of the 1st decimal trituration, repeated every few hours. It is peculiarly suitable in those cases of dilatation aggravated by venereal excesses. In doses of 10 or 15 grains every five hours it soon destroys all sexual desire and power, (while its use is continued) and arrests the cardiac irritation.

We next come to the remedies of Class III., namely: *nux vomica*, *ignatia*, *collinsonia*, *cimicifuga*, *china*, *hydrastis*, *ferrum*, *cuprum*, *hypophosphite of potassa*, *phosphoric acid*, *sulphuric acid*, *muriatic acid*, etc.

Nux vomica, and its alkaloid, *strychnia*, are the most important of this class. By referring to your notes on the treatment of hypertrophy with enlargement, you will find *nux vomica* recommended for its primary symptoms. Allusion was made to its secondary effects, which are very profound and important. The reaction from the intense stimulation (primary) induces a condition of nervous and muscular irritability in proportion to the weakness which obtains in the nerve-centres. To make matters worse, all the important organs of the body partake of the prostration and loss of tone. The liver, stomach, intestinal canal, renal and sexual organs, and even the brain, become the seat of morbid irritability and perverted function.

I will not attempt here to give you all the symptoms which indicate its use in hypertrophy with dilatation. They are too numerous for me to mention and for you to remember. Suffice it to say, that the general mental and physical condition, the weakness and irritability of the heart, the aggravations after meals and from emotions, and the dyspeptic symptoms, must be your guide. First be sure of your diagnosis, then consult the *Symptomen Codex*, or the excellent *materia medica* cards of Prof. Hoyne, and prescribe for the *ensemble* of the symptoms.

The dose of *nux vomica* is quite important. As a rule, the lowest dilutions or triturations will give you the best results. The 1st or 2nd decimal dilution, or trituration, one drop or one grain every three or six hours, will, in a few days or weeks, produce a notable curative result.

Strychnia will sometimes give better satisfaction than the *nux vomica*, especially when there is a preponderance of symptoms denoting spinal exhaustion, and a general tendency to paralysis of muscular power and torpor of function. Use the *centesimal* triturations, from the 1st to the 3rd.

Ignatia, while it resembles *nux vomica* in some respects, has important symptomatic differences. It is more suitable for women; for the hysterical condition; for irregular manifestations of a spasmodic character; and for the effects of grief. A characteristic symptom which is a valuable guide is the "sensation of great weakness and sinking in the stomach." This feeling oftener proceeds from cardiac weakness than any other cause.

Dose: the same as *nux vomica*.

Collinsonia is certainly of considerable value in this disease. While it does not appear to me to act on the nerve-centres like *nux vomica*, it resembles that remedy closely in its action on the vegetative system, and the various organs of the body. Dr. Squire thinks* we have no remedy superior to it in chronic functional or structural diseases of the heart. He asserts that he has given it in nearly one hundred cases of cardiac trouble, and that it has not failed to give relief in a single case. In one patient suffering with hypertrophy, the irregular action of the heart ceased in a few days, and in three months he was discharged cured. The doses used in these cases were 15 drops of the fluid extract three or four times a day. He remarks that, "*larger* doses did not have the desired effect," which shows that pathogenetic aggravations were present in some degree.

The 1st dilution, or drop doses of the tincture, may be prescribed. Consult the provings and account of its cures in "New Remedies," for further indications.

Cimicifuga, from its well-known action on the muscular and nervous system, will doubtless often aid you in the treatment of hypertrophy with dilatation. It is *the* remedy, *par excellence*, for the palliation and cure of *myalgia*. It occupies a place between *nux* and *china*, partaking of the characters of both. It does not seem to affect the functions

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* Eclectic Medical Journal, Vol. 1871, page 267.

of the vegetative system so much as the nerves of motion and sensation. All weakened muscles become irritable, painful, and subject to spasmodic movements. *Cimicifuga* controls this condition, and restores the normal tone of the nerves which supply the muscles. Chorea is sometimes associated with cardiac debility; even the movements of the heart may partake of that character. In such cases, no remedy rivals *cimicifuga*. If the disease is a sequel of muscular rheumatism, this medicine is especially indicated. In dilatation during pregnancy, or at the critical age, no remedy will prove more useful. If sympathetic cerebral symptoms occur, *cimicifuga* will be finely indicated.

Dose: the dilutions from 1st to 3rd, or the lowest triturations of *cimicifugin* (*macrotin*), its active principle. Do not leave off its use too soon, or change the remedy until you are sure it is not appropriate.

Agaricus should be consulted if *cimicifuga* seems indicated but does not give satisfaction.

China, or its alkaloid, *quinine*, has already been spoken of. While you will rarely have to use it in enlargement, you will frequently find it invaluable in dilatation. It is especially useful if the disease is associated with, or produced by malaria, loss of the vital fluids, long-continued night watching, or deficient food. The action of the heart may be very tumultuous, while the real force is weak; the blood is poor, and deficient in quantity; the countenance sallow; digestion impaired, with tendency to flatulence; there is ringing in the ears, vertigo, and night sweats.

Hydrastis, or the active principle, *hydrastin*, ranks next in importance. As a restorer of the tone of muscular tissue it is not surpassed. It is indicated in those cases which do not arise from malaria, but which appear to indicate *china;* also for those cases where the action of the heart is persistently weak and excited, and where the patient is emaciated, is troubled with indigestion, and the liver is also deranged. Its persevering use will bring about permanent good results.

Dose: the lowest dilutions of *hydrastis*, or triturations of *hydrastin*.

Ferrum. All the preparations of iron are indicated in dilatation, especially if it co-exist with anæmia. In selecting

the preparation, the idiosyncrasies of your patient must be taken into account, as well as the bodily constitution. *Ferrum metallicum* or *ferrum carb.* are indicated in uncomplicated cases. If fatty degeneration of the heart is suspected, use *ferrum iod.* If dyspeptic symptoms predominate, try the *lactate of iron*, or the double salt of *iron* and *strychnine.* Certain cases will require the *phosphate of iron*, and others improve rapidly under the *tinct. ferr. muriaticum* in the low dilutions. The dose of the ferruginous preparations may range from the 1st to the 6th.

Cuprum, according to Grauvogl, will cure some diseases associated with anæmia when *iron* fails. For dilatation with fatty degeneration it appears to be decidedly indicated.

The *hypophosphite of potassa* is a favorite remedy with me in all heart affections with muscular atony or myalgia. All the potash salts appear to have an affinity for muscular tissue, and none more so than this. If the patient has been prostrated by excesses, loss of fluids, loss of sleep, mental labor, and is emaciated, use this salt in doses of $\frac{1}{4}$ to $\frac{1}{10}$th grain three times a day; alternate with *hydrastis*, *nux vomica*, or *collinsonia*, and the results will be very satisfactory.

The *mineral acids* have not been used as often or as thoroughly in cardiac affections with debility, as their merits demand. The *phosphoric acid* is unrivalled as a remedy when indicated by the general symptoms of the patient. *Sulphuric acid* has enabled me to relieve and prolong the life of several patients suffering with dilatation, co-existing with Bright's disease. Not only did the heart's action improve under its use, but the renal disease was decidedly benefitted, the dropsical symptoms disappeared, and the appetite and strength returned in a short time.

Muriatic acid will prove a valuable remedy in your hands. Study the provings well, and the clinical indications, and select accordingly. In prescribing these acids, insist on the aqueous dilutions, from the 1st to 3rd, sufficient to render the water slightly acid, and repeat the dose four or five times a day.

The remedies of Class IV., namely, *belladonna*, *solanum*, *lachnanthes*, *glonoine*, *stramonium*, *agaricus*, *æthusa*, *conium*, etc., will be found useful as palliatives when paroxysms of

obstinate palpitations, attended by local congestions, occur. In the so-called cardiac apoplexy they are useful medicines.

I cannot give you the indications for all these remedies. You must be guided by their characteristic symptoms and pathological effects. You will find that the middle dilutions (6th to 30th) will give the best results.

Do not forget the anti-psoric remedies while treating dilatation, for they will prove of service to you in combatting lurking miasms, and arousing the dormant energies of the organism.

The *stillingia* and *chimaphila* are very important antipsoric remedies, as well as those introduced by Hahnemann. All this class should be used in the middle or higher attenuations.

LECTURE IX.

LESIONS OF THE WALLS OF THE HEART.

Atrophy of the Heart — Fatty Growth — Symptoms of Fatty Growth — Fatty Degeneration — Symptoms of — Pathological Effects — Treatment — Softening of the Heart — Induration of — Rupture of the Heart — Treatment of the Various Lesions.

GENTLEMEN: The walls of the heart are liable to various lesions, other than hypertrophy. In this lecture I shall briefly consider these organic affections and their treatment.

ATROPHY OF THE HEART

is a condition in which the muscular substance is diminished, the cavities not enlarged, but actually lessened. The whole heart is smaller than the normal size. Its weight is diminished in proportion to its size, but the organ does not change its appearance in any other respect.

Causes. It generally attends chronic disease where there is gradual progressive emaciation. It has been observed in tubercular phthisis, pericardial adhesions, calcification of the coronary arteries, and an excess of fat on the exterior of the heart. The heart wastes like other muscles when badly nourished.

The *symptoms* are those which denote feebleness of the circulation, but the feebleness of the circulation may have existed prior to the atrophy. The physical signs suffice for the diagnosis. The boundaries of the superficial cardiac regions are within the limits of health, the apex-beat is indistinct or wanting, and the heart-sounds are abnormally feeble, and may be inappreciable.

The *treatment* of atrophy, when due to impaired nutrition, is the same as that adopted for enlargement by dilatation

The remedies in Class III., together with a highly nutritious diet, to which may be added cod liver oil in doses of 20 or 30 drops three times a day.

FATTY GROWTH AND DEGENERATION.

Fatty growth. More or less fat is generally present in health, on the outer surface of the heart, after early infancy, especially on the right ventricle, at and near the base of the organ. It is most abundant between the ventricle and auricle, and around the coronary vessels. A small amount of over-accumulation is sometimes found in *post-mortem* examinations, where there had been no symptoms of disease of the heart during life. When the accumulation is excessive it leads to enfeebled muscular action, and consequent weakness of the circulation. It may induce atrophy of the heart. Fatty growth usually occurs after the middle period of life, and in persons of adipose diathesis. It may, however, occur in persons who are not corpulent. You will most frequently find it in persons who are growing fat rather rapidly. The heart has been known to become completely encased in a thick layer of adipose tissue.

Fatty infiltration is another and more serious form. In this disease there is an accumulation of fat between the muscular fibres. The pressure upon the fibres causes functional weakness and atrophy, and leads to dilatation.

Fatty degeneration is much more serious, and differs essentially from the two varieties I have just mentioned. The fat, in the form of oil drops or granules, replaces the muscular substance, and constitutes a form of fatty atrophy. It may be associated with fatty growth of the heart, but it occurs independently of the latter. It affects more especially the *left* ventricle, while fatty deposits *on* the heart affects the *right*. It may be uniformly diffused, but is oftener confined to circumscribed patches or strips. The portions affected assume a yellowish or fawn color, and if it occurs in patches, gives the heart a mottled appearance. Examined with the *microscope*, the striæ, or transverse markings of the fibres are indistinct or wanting, and in place of the proper constituents of the muscular fibre, there are oil globules and

granules, in more or less abundance, according to the amount of degeneration.

In this disease, fat replaces the muscular substance, and in proportion as this result obtains, the propulsive power of the heart is diminished; it yields more readily to distension, and dilatation occurs. Authorities differ as to the real condition, for while some believe that the muscular substance is *changed* into fat, others believe that the fat is *substituted* for the normal muscular substance. Others teach that it is a chemical, not a vital process.

Causes. As I have before stated, you will not always find either variety in adipose persons. It often occurs in persons who have fatty deposits or fatty degeneration elsewhere, as in the liver or spleen. The etiology may involve both general and local causes. Among the local causes is impairment of nutrition from obstruction of the coronary arteries, from atheromatous or calcareous disease. It may occur from hypertrophy, valvular lesions, emphysema, or Bright's disease. It occurs in connection with the tuberculous and carcinomatous cachexia, also in cases of pyæmia or septicæmia. It may be caused by the poisonous effects of *phosphorus*, *arsenic*, and some other poisons. *Alcohol*, in excess, undoubtedly has a causative influence. In old habitual drunkards this condition is generally found after death.

SYMPTOMS AND PATHOLOGICAL EFFECTS.

Although the different forms of fatty disease differ patho logically, their general effects are similar. Both cause weakness of the heart and enfeebled circulation, but not in an equal degreee. I have told you which produces the most serious results. Fatty growth, and even degeneration may be present in a large degree, and not suspected up to the moment of death; and rupture of the heart has been known to occur from fatty degeneration, and the patient show no symptoms of the disease during life.

The *pulse* may be very slow, down to 20 or 30, and even 8 or 10, per minute. It will always be deficient in *force*.

It may be intermittent, irregular, very frequent and feeble.

A sense of oppression at the præcordia, palpitation, and a tendency to syncope, are commonly observed. Flint has observed, and so have I, a notable degree of capillary congestion of the extremities. In one case which came under my observation, the hands and feet would become intensely red, especially after meals. Dyspnœa is present in this, as in other heart affections.

Certain symptoms referable to the nervous and respiratory system, are supposed to be highly significant of fatty degeneration: (1) The occurrence of seizures resembling apoplexy, but not followed by paralysis. After death no morbid appearances are observable in the brain; (2) A peculiar aberration of the respiratory movements was observed by Cheyne, and Stokes, "It consists in the occurrence of a series of inspirations increasing to a maximum, and then declining in force and length until a state of apparent apnœa is established. In this condition, the patient may remain for such a length of time as to make his attendants believe he is dead, when a low inspiration, followed by one more decided, marks the commencement of a new ascending and then descending series of inspirations." This is said only to occur a few weeks before the death of the patient. But this symptom has been known to occur from hypertrophy of the left ventricle, without fatty degeneration; (3) Fatty degeneration of the *cornea*, giving rise to that appearance known as *arcus senilis*, has been observed, but I have observed it when no symptoms of heart disease were present.

PHYSICAL SIGNS AND DIAGNOSIS.

You will not find it very easy to diagnose fatty disease of the heart from the physical signs; but if no valvular disease is present, and hypertrophy is not found, and the heart's action is feeble, and the patient is adipose, you may safely *infer* the presence of fatty heart.

If you suspect fatty *degeneration*, and find that percussion shows moderate or no increase of the volume of the heart, you have a negative point. If you find that the apex-beat is not removed from its normal position, and its beat feeble, or inappreciable—and no impulse elsewl.ere than over the apex;

and if by auscultation you find the sounds of the heart weakened, the first more than the second, and that is short and valvular; and, finally, if you find both sounds extinct, you may safely consider the case one of fatty degeneration.

TREATMENT.

In the treatment of fatty growth and degeneration, you must have three objects in view, namely:

I. To obviate and relieve the immediate effects of weakness of the heart.

II. To increase permanently the muscular power of the organ.

III. To arrest or limit the accumulation of fat.

I. The immediate effects of the cardiac weakness are, palpitation and præcordial distress, syncope, dyspnœa, and perhaps apoplectiform attacks. These occur in paroxysms, excited by over-exertion, mental excitement, etc. To combat these symptoms, you should use as palliatives, in severe attacks, wine, spirits, ether, or ammonia, and continue their administration until the urgent symptoms disappear or are much relieved. The specific remedies for these symptoms you will find in Classes I. and II., in the treatment of dilatation, with the indications for their use, to which I refer you. In the apoplectiform seizures, especially, you will find *Gelseminum* 6th, or *Acidum hydrocyanicum* 3rd, particularly indicated—the former if the attack was rather slow in coming on, the latter if it was very sudden in its invasion. In general, the two best remedies are undoubtedly *Aconite* and *Digitalis*—the former in the 3rd dilution, the latter in the 1st or mother tincture. Whichever remedy you select, give it as frequently as the urgency of the case demands, until the pulse becomes full and regular, and the condition of the patient has much improved. If the extremities are cold, advise the mustard foot and hand bath, to divert the blood from the heart.

II. The second object is to increase permanently the muscular power of the heart. This is to be accomplished by the judicious administration of those remedies belonging to

Class III. mentioned under "Dilatation," namely: *Ferrum* and its various preparations (the *Iodide* is the best in this disease), *nux vomica*, *ignatia*, *hydrastis*, *manganese*, *aletris*, *helonias*, *china*, *ptelia*, *cuprum*, *platinum*, *plumbum*, the *hypophosphites*, and the mineral acids.

The anti-psorics may be useful to combat the various dyscrasia, and may be advantageously alternated with the remedies just mentioned.

You will find that the lowest attenuation of Class III. will bring about the best results, while the high dilutions of the anti-psorics are most appropriate.

The *diet* of the patient is of great importance. You should aim to produce a healthy nutrition of the affected organ by rendering the blood rich in nutritive materials. All articles of diet allowed should be highly nutritious and easily assimilable. As large a portion of animal food as the digestive powers will permit should be advised. The meat should, however, be lean, tender, and properly cooked. The quantity of fluids should be restricted, in order not to make the quantity of water in the blood excessive. Warm clothing, especially about the extremities, should be insisted on. Excess of all kinds, in eating, drinking, venery, mental occupation or excitement, late hours, etc., should be prohibited. As physical indolence predisposes to this affection, a judicious course of exercise in the open air should be advised. But while exercise is advised, it should not go to the point of causing dyspnœa or palpitation. In order to have exercise do good there must be an interesting object. For this reason, hunting, fishing, botanizing, horseback riding, etc., are the best methods.

III. It is important that you should try to arrest or limit the accumulation of fat in or upon the heart. Although the pathological condition in the two forms differ, we do not know that the dietetic treatment should differ. All fatty and saccharine substances should be avoided. Starchy food is also inadmissible except in small quantities. The diet should consist of lean meat, bread, non-farinaceous vegetables, and certain kinds of fruit, principally the acid fruits.

Of medicinal remedies, those which act chemically cannot

be used with safety and they have been abandoned. The *bromide of ammonium*, in doses of 5 or 10 grains, three times a day, seems to have the power of diminishing adiposis without injuring the health. I have found that *graphites*, 6th and 30th, used for a month or more, has the same effect. *Phytolacca* appears to have the power of diminishing the amount of fat in the system, when given in the lowest dilutions. It is claimed that the *iodide of potassa* has the same effect. But these remedies should always be alternated with the *ferrum* group.

Baehr says, after recommending *iodine* and *calcarea*, "We have two other remedies which we cannot recommend with sufficient emphasis in heart-disease generally, and more especially in fatty degeneration, we mean *cuprum* and *plumbum*. Both remedies act similarly, except that the action of *plumbum* is more persistent and penetrating." He gives the following indications taken from cases of poisoning:

"*Cuprum:* pulse irregular, small, easily compressible, intermitting, accompanied by excessive muscular debility; the beats of the heart are scarcely, or not at all, perceptible; the sounds of the heart are indistinct; dyspnœa; feeling of anxiety; disposition to faint.

"*Plumbum:* the impulse of the heart is very feeble, or even imperceptible; sounds of the heart indistinct; palpitations, attended with excessive dyspnœa; pulse very soft, easily compressible, intermitting, irregular, 50 to 60 in a minute, less frequently over a hundred, after which it is scarcely perceptible; heart flabby; sudden paralysis of the heart; fainting fits during every exertion, also, attended with slight convulsions, extreme muscular debility, and oppression from the least motion; despondency and dread of death; night mare; œdema of the skin."

The *iodide of lead* ought to prove more valuable than the pure lead for fatty degeneration of the heart.

Baehr thinks *aurum* will prove a good remedy.

Phosphorus and *arsenicum* are the two medicines which correspond pathologically to fatty degeneration. Both cause fatty heart, as well as fatty degeneration of the liver and kidneys. The pathogenetic symptoms also correspond, and theoretically they ought to cure this malady, but we

have no clinical testimony to substantiate it. I would advise you to try them when indicated, in the 3rd or 6th attenuation, for a sufficient length of time to test their curative powers.

I have sent a few patients, whose adipose growth in general was immense, to a most rigid hydropathic establishment, where a few months' residence removed a large quantity of the abnormal deposit.

SOFTENING OF THE HEART.

I have already called your attention to this condition, when speaking of inflammation of the heart. It has also been considered as incident to fatty degeneration. It occurs during the course of essential fevers, especially typhoid fever and typhus. Sometimes the softening is limited to the left ventricle, and sometimes it extends all through the heart-substance.

When softening has taken place the walls are relaxed and feeble; the structure easily torn with the finger; the organ is flaccid and collapses with its own weight, not preserving its natural form, but retaining, like a wet cloth, any shape in which it is placed. When incised, the cut surfaces are dry and unpolished, and the color of the cut surface is purplish and livid.

Symptoms and physical signs. These are the same as in fatty degeneration. They proceed from weakness of the organ, and loss of muscular power. Stokes gives the best indications for the diagnosis of this affection, especially when it occurs during fever.

Treatment. The sole indication for the treatment of softening from any cause, is to sustain the failing power of the heart by stimulants, aliments, and restorative remedies. The use of wine, brandy, egg-nogg, beef-tea, wine-whey, aided by *china*, *hydrastis*, *ferrum*, *phosphorus*, and the mineral acids, should be freely used, until the action of the heart denotes such an amount of force as to free the patient from danger. In severe cases the patient must not be allowed to sit up, or make any sudden movements while the heart is very weak. Fatal syncope has been known to occur from such imprudence.

INDURATION OF THE HEART.

This lesion is so rare, and so difficult of diagnosis, that I will not speak of it at length, nor shall I treat at length of

CARDIAC ANEURISM,

a condition rarely met with, but which the older pathologists confounded with hypertrophy with dilatation. Although a rare lesion, Thierman has collected seventy-four cases on record. The aneurismal dilatation forms a tumor, varying in size, in different cases, from that of a small nut to a sac as large as, or even larger than, the heart itself. It contains layers of condensed fibrin, and various forms of coagula like arterial aneurisms. It is sometimes lined or studded with calcareous matter. For a fuller consideration of this subject, I refer you to works on morbid anatomy.

Flint gives five interesting cases which came under his personal observation.

Treatment. No cure can be effected; but the same treatment recommended for dilatation of the heart would be appropriate, and perhaps palliate suffering and prolong life. Some of the early homœopathic writers recommended *lachesis* and *lycopodium*, but we are in doubt whether they referred to hypertrophy with dilatation or true aneurism.

RUPTURE OF THE HEART.

It is believed that spontaneous rupture of the heart is of rare occurrence; and Flint doubts if it has ever occurred as a result purely of muscular activity of the organ. He believes it is always dependent on some prior morbid condition of the cardiac parieties. I believe, however, that cases are on record where rupture of the heart has occurred from violent mental emotion, independent of cardiac disease. A singular book has lately been published in England, treating of the diagnosis of the crucifixion of Christ. The authors are the eminent London surgeons, William Stroud and Sir J. Y. Simpson. Dr. Stroud, after citing and commenting on a long series of instances of bloody sweat, feels

warranted in the conclusion that, "owing to the natural constitution of the human frame, the exciting passions, when violent, and especially when accompanied with agony or conflict, are capable of producing bloody sweat, and when still more intense, rupture of the heart." Among other medical authorities he quotes the younger Gruener, to the effect that it is common for a person whose heart is oppressed by excessive congestion of blood, and who is threatened with suffocation, to "cry out with a loud voice;" and also Dr. Walshe, Professor of Medicine in University College, London, who says, that in case of rupture of the heart, the hand is suddenly carried to the front of the chest and a piercing shriek uttered. Sir James Y. Simpson, whose high rank in the profession has won for him the title of Baronet, adds an appendix to Dr. Stroud's treatise, in which he says, in substance, that usually death very rapidly ensues, in consequence of the blood escaping from the interior of the heart into the cavity of the large surrounding heart-sac or pericardium, and that in such cases the sac will be found, on dissection, to contain two, three, four, or more pounds of blood accumulated within it, and separated into red clot and limpid serum, or "blood and water." As dissection was not practiced in ancient times, the nature of this rare disease was not understood, if indeed its existence was even suspected. These surgeons agree, therefore, that death was occasioned, not by pain and physical exhaustion, which, in a person in the prime of life, would require two or three days, but by a literally broken heart.

Rupture of the heart is almost inevitably fatal, and death occurs instantaneously. Walshe, however, states that one case has been recorded of death from rupture, in which a former rupture was discovered firmly filled by a fibrinous coagulum, adherent to the wall of the heart.

Wounds of the heart belong to the domain of surgery, and I will only say to you, that they are not as fatal as is generally supposed. In the "Surgical Memoir of the War" you will find several cases to substantiate this statement.

LECTURE X.

VALVULAR DISEASES OF THE HEART.

Aortic Lesions — Mitral Lesions — Primary Effects of Valvular Disease on the Circulation — Symptoms and Pathological Effects of Valvular Lesions — Secondary Effects of Valvular Lesions — Pain — Palpitation — Cardiac Dropsy — Symptoms of the Respiratory System — Symptoms of the Nervous System — Symptoms of the Digestive System — Symptoms of the Genito-Urinary System — General Symptoms.

GENTLEMEN: I now come to those diseased conditions of the valves and orifices of the heart which go under the general name of Valvular Diseases. I have reserved this subject for my last lectures because these lesions are connected with, and are the results of the inflammatory affections hitherto treated of. Another and important reason is, that many diseases and functional disorders of various organs of the body, which are often considered idiopathic by unobserving physicians, are really the result of valvular lesions. If the heart does not work in a normal manner, the circulation all over the body is imperfect, and every other organ becomes deranged.

The clinical study of these lesions is of great interest, on account of the wonderful precision with which modern diagnosis, by means of auscultation, enables us to locate the situation and nature of the lesion.

In treating of valvular lesions, my main object will be to describe their immediate and remote effects, and the means by which we can make a correct diagnosis, and finally, the appropriate homœopathic treatment for these effects. The cause can rarely, if ever, be removed.

I shall first take up for your consideration the

AORTIC LESIONS.

Lesions affecting the aortic valves may be limited to one or two of the semilunar segments; but in most cases all are more or less affected. Thickening of the segments is one of the most frequent of the morbid changes. This will not specially impair the function of the valves, but their expansion will be somewhat sluggish, and the intensity of the aortic second sound of the heart must be in some measure diminished.

The segments are often contracted as well as thickened. Consequently a current of blood is forced backward from the aorta into the ventricle, by the recoil of the arterial coats. At the same time the aortic second sound of the heart must be weakened by the diminished size of the valves as well as by the thickening.

Rigidity of the valves from calcareous deposit is of frequent occurrence. The segments are sometimes expanded, and being encrusted with calcareous salts, appear to be completely petrified. This was formerly called ossification.

Another variety of lesion consists in the presence of warty excrescences or vegetations. These are generally attached at or near the free border of the segments, on their ventricular aspect.

These vegetations may be loosely attached, and liable to be separated by the force of the current of blood during life, and become emboli, and obstruct the circulation in the arteries.

Attenuation from atrophy is also a lesion to which the valves are liable. Rupture, under these circumstances, is liable to occur.

Perforations may occur at any point where the valves are softened, and perhaps at the same time thickened.

Lesions in the aorta, extending, to a greater or less extent, above the valves, are, in the majority of cases, associated with lesions of the aortic orifice. The artery may be dilated or contracted.

MITRAL LESIONS.

Lesions at the mitral orifice are essentially the same as aortic lesions, the points of difference relating chiefly to the

differences, as regards form and arrangement, of the mitral valves. As a result of their insufficiency, a retrograde stream or current, from the ventricle into the auricle, takes place with each systole of the ventricle, the quantity of blood thus regurgitating, of course, being proportionate to the extent of the mitral insufficiency.

Rupture of the tendinous cords connecting the free margins of the valves with the papillary muscles occasion insufficiency of the mitral valves.

The deposit of calcareous salts at the base of the valves gives rise to lesions, and reduces the the auriculo-ventricular orifice to a small aperture.

Vegetations and warty excrescences occur in this situation as at the aortic orifice. But the most frequent mode in which contraction of this orifice is produced is by the union of the curtains at their sides, leaving a narrow slit through which the blood passes from the auricle into the ventricle.

Aneurism of the mitral, as well as of the semilunar valves, is another variety of lesion.

It is evident, that in so far as the different lesions which have been noticed interfere with the play of the mitral valves, the first sound of the heart must be weakened and modified by the diminution or extinction of the valvular element of this sound.

SYMPTOMS OF AORTIC AND MITRAL LESIONS.

As symptoms referable directly to the heart may be noticed: pain, palpitation, abnormal changes of the pulse, turgescence of the veins, and venous pulsation.

Pain. Absence of pain is the rule, but occasionally patients complain of painful sensations referred to the præcordia. A sense of constriction, uneasiness, or undefinable distress, is oftener met with than actual pain.

Palpitation. Is due, not directly to the lesions of the valves or orifices, but to the hypertrophy to which they have given rise. When the patient complains of the beating of the heart, the impulse is found, on applying the hand over the præcordia, to be abnormally forcible. This increased

force is observed when the patient is not aware of any such palpitation. Palpitation, therefore, may be present as an objective, when it is wanting as a subjective symptom.

Other things being equal, the increased violence of the heart's action is proportionate to the amount of hypertrophy, and especially hypertrophy of the left ventricle.

Usually, if the patient complain of undue violence or of irregularity of the heart's action, exclusive of other circumstances, the presumption is that organic disease does not exist.

Palpitation from functional disorder always occasions great uneasiness, and generally intense anxiety and alarm.

It is quite otherwise with palpitation incident to organic disease. As a rule, then, and you may consider it a safe one, palpitation, when accompanied with great uneasiness and uncomplicated, indicates or will suggest to you the non-existence of structural lesion.

Palpitation due to organic disease is less violent. Functional palpitation occurs often when it cannot be traced to any exciting cause, and is more likely to occur when the patient is at rest.

Pulse. You must accustom yourselves to the movements as given by the pulse in heart affections, as well as in other disorders, and it is only by close observation at the bed-side that you will attain that peculiar sense of touch necessary to aid you in your investigations.

You will observe the size, strength, as compared with the heart's impulse (which never overlook), rhythm, its quickness or slowness, the duration of the movement of the artery under the finger, etc.

Frequency of the pulse, although important as representing the general condition of the circulation, and the state of the vital forces, has no special significance as regards vavular disease.

In mitral lesions attended by regurgitation, the size and strength of the pulse are diminished in proportion to the quantity of blood driven backward by the systolic contraction of the left ventricle, into the left auricle. The weakness and smallness of the pulse are in contrast with the impulse of the heart, as felt by the hand applied over the præcordia,

provided the left ventricle be hypertrophied and the action of the heart vigorous. The pulse may be regular, but often, in an advanced stage of the affection, its rhythm is disturbed; it becomes irregular or intermitting. Variation of successive beats as respects size, force, etc., is frequently observed, although it is less characteristic of mitral regurgitant lesions than of those attended by obstruction. The frequency of the pulse in this, as in the other varieties of valvular lesions, depends on the vital condition of the heart.

In case of mitral regurgitation, the pulse is rendered small and weak by the deduction of the blood which regurgitates from the quantity which would otherwise be propelled into the aorta with each systole.

Mitral contraction, when extreme, renders the pulse not only small and weak, but often irregular, intermitting and unequal. When from any cause the supply of blood preceding the ventricular systole is less than usual, the pulse, which represents the systole of the left ventricle, is unusually small and weak. Under these circumstances the heart acts with irregularity. Intermittency of the pulse may represent intermittency of the heart's action, but it is sometimes observed where there is not a corresponding interruption in the heart's action.

Intermittency of the pulse is a peculiarity of the circulation in some persons. It is not, therefore, intrinsically a symptom of disease. Weakness, smallness, and irregularity, as well as intermittency, and even inequality, it is to be borne in mind, are not distinctive of mitral or other valvular lesions. All may occur in functional disorder of the heart. A distinguishing point pertaining to functional disorders is, they occur only during paroxysms of palpitation presenting the distinctive features of palpitation from nervous disorder, whereas, occurring in connection with valvular lesions, they are either constant or frequently recurring, and unattended by the features which distinguish functional palpitation.

Aortic lesions giving rise to obstruction are not characterized by a pulse weakened in proportion to the diminishing quantity of blood propelled from the left ventricle. In cases of aortic obstruction, when great enlargement of the heart has ensued, and especially when the muscular power

of the organ is much diminished by either dilatation or fatty degeneration, the pulse may become irregular, intermitting, and unequal. Irregularity and inequality are thus, in some measure, diagnostic of lesions affecting the mitral orifice, as contrasted with those affecting the aortic orifice; but it is to be borne in mind that they occur in cases of dilatation, fatty degeneration, etc., uncomplicated with any affection of the valves or orifices.

Slowness of the pulse, that is, the gradual expansion of the artery, as distinguished from quickness (not frequency), denotes the prolonged systole of the left ventricle, and is distinctive of aortic obstruction. In cases of aortic lesions, with considerable insufficiency, the jerking or collapsing feature of the pulse is usually strongly marked. It is not, however, a symptom of aortic obstruction.

Prolongation of the interval between the pulsation of the radial artery and the heart's impulse, is significant of aortic regurgitation.

TURGESCENCE OF THE VEINS AND VENOUS PULSATION.

Abnormal fullness of the veins occurs whenever there is an obstacle to the free entrance of blood into the right auricle. An obstacle exists when the right auricle is already full, or distended with blood. The most direct and efficient causative condition is contraction of the tricuspid orifice. Obstruction to the pulmonary circulation from emphysema of the lungs occasions an undue accumulation of blood within the right ventricle and auricle, leading after a time to enlargement, and a consequent obstacle to the free transmission of blood to the systemic veins. Pressure on the vena cava by an intra-thoracic tumor produces obstruction and venous turgescence. Thus, marked fullness of the veins of the head and neck is observed in some cases of aneurism of the arch of the aorta. As a symptom, then, this is not distinctive in itself of cardiac disease, nor, when it proceeds from the latter, does it point to the seat, or even denote the existence of lesions of the valves or orifices, but rather that the right auricle is either dilated or over-distended.

Venous turgescence is usually most conspicuous on the neck, in the jugulars and the venous branches communicating with them. In extreme cases the vessels present a varicose appearance.

If the obstruction at the right auricle be considerable, when pressure is made on a vein high on the neck, the vessel remains distended below the point of pressure, and may be refilled after the contents of the vessel have been pressed backward by the finger, showing not only a resistance to the gravitation of the blood, but a reflex current.

This symptom, taken in connection with the physical signs which establish the nature and seat of organic lesions of the heart, possesses considerable value.

Venous pulsation is a diastolic movement of the veins, which is visible, and sometimes even appreciable by the touch. The movement is due to a retrograde current or impulse communicated to the blood contained in the veins. It is to be distinguished from the movements occasioned by respiration, with which every one is familiar, and also from those communicated by subjacent arteries. With the latter it is liable to be confounded, unless care be taken to avoid this error. The error may be avoided by making moderate pressure over the veins at the lower part of the neck. Pressure here, not sufficient to stop the circulation in the arteries, will arrest pulsation of the veins. The movements due to respiration may be arrested by causing the patient to suspend breathing for a few seconds. Pulsation is rarely observed elsewhere than in the veins of the neck. It is often limited to the veins just above the clavicles. It is now admitted that venous pulsation, if marked or extensive, is, in a certain proportion of cases, evidence of tricuspid degeneration. (Flint.)

The conditions most favorable for the production of the venous pulse, are free tricuspid regurgitation and hypertrophy of the right ventricle.

The systolic contraction of the right auricle may cause a movement of the blood in a retrograde direction sufficiently to give rise to this symptom. Experimental observations show that the auricular systole precedes the ventricular. A

venous pulse due to auricular contraction should therefore precede slightly the arterial pulse, or apex-beat of the heart.

Placing the finger over the apex of the heart, the apex-beat, if it be felt, will be found to follow the venous pulse in the neck, provided the latter be produced by the contraction of the auricle; whereas if the venous pulse be due to tricuspid regurgitation, it will be either synchronous with, or lagging a little behind the apex-beat. By placing the finger over the carotid, and the eye fixed upon a pulsating vein, it is easy to determine whether the venous pulse precedes or occurs simultaneously with the beating of the artery.

CARDIAC DROPSY IN RELATION TO VALVULAR LESIONS.

General dropsy, when dependent on disease of the heart, is called cardiac dropsy. It may be due to other pathological conditions, and especially to disease of the kidney, when it is distinguished as renal dropsy. It appears first, as a rule, in the form of œdema of the feet and ankles, which gradually extends over the lower extremities. Œdema of the face follows, or may occur simultaneously with, or precede, the œdema of the feet. So enormous is the swelling sometimes, that erythema and gangrene may occur. The surface cracks or ulcerates, and allows the liquid to flow away. The surface assumes a dusky hue, due to venous congestion, which distinguishes this variety of dropsy from renal dropsy, but both may be combined. Effusion into all the serous cavities may occur. The occurrence of dropsy has reference to the situation, nature, and degree of valvular lesions. Tricuspid contraction is the lesion which most directly and efficiently tends to give rise to this effect; but this lesion is exceedingly infrequent.

The occurrence of dropsy, other things being equal, in cases of mitral or aortic lesions, will depend, not immediately on the nature and extent of these lesions, but on conditions induced thereby which relate to the right side of the heart. Dilatation of the right ventricle, or weakness from fatty degeneration and other causes, precedes, in the great majority of cases, the occurrence of dropsy.

Dropsy, therefore, is an event which usually belongs to

an advanced period of organic disease, and it is frequently a precursor of fatal termination. Enlargement of the right side of the heart, especially if accompanied by degeneration of structure or great muscular weakness, may induce dropsy when valvular lesions are not present. The occurrence thus, when aortic or mitral lesions are present, is evidence that the effects of these lesions on the right side of the heart, which have been considered under another head, have taken place.

Embolism. Arterial obstructions by vegetations or fibrinous masses detached from the valves or orifices of the heart. The obstruction is carried onward with the current in the course of the circulation, until it reaches an arterial trunk smaller than its own dimensions. Here it is arrested, obstructing the passage of blood in the artery and its branches beyond the point at which they are lodged.

Emboli from within the heart, in cases of chronic valvular lesions, are derived, in the vast majority of cases, from the left ventricle, since lesions affecting the valves of the right side of the heart are exceedingly infrequent.

Emboli derived from within the heart are sometimes calcareous. They may cause apoplexy, coma, paralysis, and softening of the brain, by obstructing the cerebral circulation. They may even cause typhoid symptoms and petechial eruptions.

SYMPTOMS AND PATHOLOGICAL EFFECTS REFERABLE TO THE RESPIRATORY SYSTEM.

The phenomena referable to the lungs, irrespective of associated or intercurrent pulmonary affections, depend, for the most part, on vascular engorgement of these organs. Congestion of the lungs is an immediate result of an impediment to the free admission into the left auricle, of blood from the pulmonary veins. An impediment exists whenever the left auricle is over-distended with blood; and over-distension of this auricle occurs as a consequence of any interruption of the blood-currents through the orifices of the left side of the heart. Obstructive lesions at the mitral orifice especially give rise to pulmonary congestion. Aortic lesions, obstructive and regurgitant, also, sooner or later, are followed by over-

distension and dilatation of the left auricle and consequent congestion of the lungs. The engorgement of the lungs arising from valvular lesions gives rise to important pulmonary symptoms without any other superinduced affection of these organs. The most prominent of these symptoms are dyspnœa, cough, muco-serous expectoration, and hæmoptysis. Certain pulmonary affections appear in some cases to be dependent, directly and exclusively, on over-distension of the vessels, namely, extravasation of blood, or apoplexy of the lungs, and œdema. The existence of valvular lesions thus involves a liability to bronchitis, pneumonitis, pleurisy, and emphysema.

Dyspnœa is a symptom more or less prominent in the great majority of cases. It occurs earlier and is more marked in cases of mitral than aortic lesions, because the former tend more directly, and in a greater degree, to engorgement of the pulmonary vessels. In most cases of either mitral obstruction or regurgitation, dyspnœa is the first symptom which occasions inconvenience. The patient often complains of this symptom alone, or chiefly, for a considerable period. In cases of aortic lesions it occurs later, and is oftener preceded by palpitation or other symptoms, referred by the patient to the heart.

The intensity of dyspnœa varies greatly in the different cases of valvular affections in which this symptom is present, and in the same case at different periods. It consists, at first, of a slight deficiency of breath on exertion. This progressively increases until active exercise becomes insupportable. Other cases are characterised by paroxysms of difficult breathing when not provoked by exercise, and by more or less difficulty which is constant. Affections of the pulmonary organs, super-added to congestion, contribute to increase the amount of dyspnœa. This dyspnœa has been designated as *orthopnœa* when extreme, and also as *cardiac asthma.*

Cough and expectoration are usually present when valvular lesions have induced considerable pulmonary engorgement. The expectoration is muco-serous in its character. The prominence of the cough and the charater which the expectoration presents will serve to indicate, on the one hand,

merely congestion of the bronchial membrane, or, on the other hand, a superinduced pulmonary affection.

Hæmoptysis is a symptom which occurs in a pretty large proportion of cases of valvular lesions attended with a marked degree of engorgement of the lungs.

Hæmorrhagic extravasation, pneumorrhagia, or pulmonary apoplexy, involves the same pathological explanation as hæmoptysis, but occurs much more frequently than the latter. It is an occasional effect of engorgement. In most of the cases in which it occurs there exists mitral contraction.

Hæmoptysis and hæmorrhagic extravasation occasionally co-exist.

Pulmonary œdema is another pathological effect attributable directly to over-distension of the vessels of the lungs. This event takes place much more frequently than extravasation of blood. Occurring alone, or irrespective of dropsical effusion elsewhere, it belongs among the events incident to an advanced stage of valvular lesion. As a rule, whenever events of importance referable to the respiratory system become developed, valvular lesions have existed for a considerable length of time, and have led to more or less enlargement of the heart. Certain pulmonary affections, not due directly or exclusively to the congestion proceeding from valvular lesions, are more apt to occur under these circumstances than if the latter did not exist. The lesions thus indirectly predispose to the development of these affections. Emphysema of the lungs is one of these affections.

The congested state of the bronchial mucous membrane renders it prone to inflammation. *Bronchitis* is a frequent complication of valvular lesions after they have induced pulmonary engorgement. This complication developed when the lungs are already congested, in connection with cardiac lesions, dyspnœa becomes more or less prominent. The co-existence of bronchitis not only adds to the distress incident to valvular lesions, which interfere with the pulmonary circulation, but, if severe or extensive, often places the patient in immediate danger—the accumulation of mucus within the bronchial tubes, together with the diminished calibre of the tubes from swelling of the membrane, inducing suffocation.

Dropsical effusion into the pleural sacs rarely occurs to much extent independently of general dropsy. When it does take place, the compression of the lungs by the effused liquid abridges their functional capacity, aggravates the dyspnœa, and hastens a fatal issue.

SYMPTOMS AND PATHOLOGICAL EFFECTS REFERABLE TO THE NERVOUS SYSTEM.

It is a common impression that various symptoms denoting cerebral disorder, such as cephalalgia, vertigo, tinnitus aurium, muscæ volitantes, etc., etc., are usually observed, sooner or later, during the progress of cardiac disease. These symptoms are often observed in persons not affected with disease of the heart, and hence would possess small diagnostic significance were they more frequently present; but, the truth is, they occur in only a small proportion of cases, at least in a marked degree.

Valvular lesions, accompanied by enlargement of the heart, have been supposed to involve a strong liability to apoplexy. We may conclude that apoplexy is very rarely due, distinctly or exclusively, to the condition of the heart, but that the changes which the cerebral vessels undergo, or other circumstances, generally play an important part in its production. And of the two conditions which tend directly to affect the circulation in the brain, namely, obstruction at the right side of the heart, and hypertrophy of the left ventricle, the former must be considered as most likely to lead to serious results.

Apoplexy occurring in connection with cardiac lesions, generally depends on extravasation of blood. Under these circumstances, paralysis of course ensues; if the apoplectic attack do not prove suddenly fatal, the patient is found to be hemiplegic. Vegetations, or masses of fibrin from within the cavities of the left side of the heart, being detached, are liable to become fixed in an artery of the brain, and give rise to apoplectic seizures with hemiplegia, or to the latter without the former.

Arterial obstruction gives rise to apoplectic phenomena and paralysis, by lessening the supply of blood to certain portions of the cerebral substance.

Aside from apoplexy and paralysis, various symptoms already mentioned, namely, pain, vertigo, tinnitus, etc., are occasionally associated with valvular lesions. Apoplexy and paralysis, depending either on an extravasation which involves a morbid condition of the cerebral vessels or an arterial obstruction from emboli, are usually not preceded by premonitions referable to the brain. This is a practical point to be borne in mind, in order that needless apprehension be not entertained on the part of physician or patient, and measures employed with a view of warding off an attack of apoplexy or paralysis, which, being uncalled for, will be likely to be not only unnecessary but injudicious. In the cases in which there is of necessity more or less cerebral congestion, the superficial veins of the neck being swelled or pulsating, marked cerebral symptoms are by no means uniformly present. Headache, dullness of the intellect, listlessness, drowsiness, etc., are symptoms which, in a certain proportion of cases of this description, are more or less marked, and are probably due to abnormal fullness of the cerebral veins. These symptoms of cerebral oppression are sometimes marked in cases in which, either from obstruction of the right side of the heart, or imperfect oxygenation of the blood, the prolabia and surface of the body present a livid appearance.

The *sleep* of patients affected with cardiac disease is frequently imperfect. They complain often of frightful dreams. This is generally associated with dyspnœa, and appears to be owing to disturbed respiration rather than to disordered cerebral circulation. Moaning in sleep is a symptom observed in some cases when the patient is not wakeful nor conscious of any morbid sensations.

A symptom which may be included among the events referable either to the nervous or respiratory system, is noticed in some cases, namely, a choking sensation analagous to that experienced in painful emotions when an effort is made to refrain from weeping. The mental condition of patients affected with organic disease of the heart may be noticed in this connection. The contrast presented, in this respect, with patients affected with merely functional disorder, has been already referred to. Persons with organic disease

which has given rise to grave symptoms, such as palpitation, dyspnœa, dropsy, etc., are generally free from excitement and apprehension. They often seem to be remarkably indifferent or apathetic.

SYMPTOMS AND PATHOLOGICAL EFFECTS REFERABLE TO THE DIGESTIVE SYSTEM AND NUTRITION.

The phenomena manifested in connection with the digestive apparatus, in cases of valvular lesions, proceed from congestion of the systemic venous system. Assuming the lesions to be either mitral or aortic, or both, congestion of this order of vessels depends on the effects of these lesions on the right side of the heart. It may be stated that, as a rule, the systemic congestion is not sufficient to give rise to important symptoms or pathological effects until dilatation of the right ventricle has taken place, involving over-distension of the right auricle, and, in certain cases, tricuspid regurgitation. The impediment to the free admission of blood from the venæ cavæ into the right auricle, occasions cerebral congestion, as has just been seen. The congestion throughout the body thus induced, as has also been seen, gives rise to venous turgescence and general dropsy. The abdominal viscera indirectly participate in the effects of this impediment at the right ventricle, owing to their vascular relations to the venæ cavæ being through the intervention of the portal system. In view of the anatomical peculiarities of the latter, it is obvious that, of the organs comprising the abdominal viscera, the liver is first affected by an obstruction at the right side of the heart. The pressure of the portal branches on the biliary tubes may occasion an undue accumulation of bile in the latter. (Flint.)

I have observed obstinate cases of jaundice in several cases of valvular disease of the heart.

Sections of the organ then present that peculiar aspect commonly known as the "nutmeg liver."

Extending beyond the liver to the portal vein and its radicles, the congestion affects finally the stomach and intestines, the spleen and the pancreas. Congestion of these organs is a secondary effect due directly to the mechanical obstacle to the passage of blood through the liver.

The successive steps, then, in the series of congestive effects dependent on valvular lesions are: obstruction or regurgitation at either the mitral or aortic orifice, or at both situations; dilatation of the right ventricle, following engorgement of the pulmonary vessels; over-distension of the right auricle, with or without tricuspid regurgitation, involving an impediment to the free transmission of blood from the vena cavæ; congestion of the hepatic veins and their radicles, the intralobular veins; congestion of the terminal branches of the portal vein; congestion of the vena portæ and its radicles in the abdominal viscera, these vessels furnishing the blood for the portal circulation.

Enlargement of the liver is an occasional effect incident to valvular lesions, as well as to enlargement of the heart without these lesions.

Cirrhosis is not a frequent complication of valvular affections of the heart. The event denoting co-existing cirrhosis is hydroperitoneum in a degree disproportionate to the general dropsy.

There are many other disorders in a measure incident and common, such as dyspepsia, hæmorrhage from the bowels, hæmorrhoids, enlargement of the spleen, etc., which you can study at your leisure in the various works on diseases of the heart.

SYMPTOMS AND PATHOLOGICAL EFFECTS REFERABLE TO THE GENITO-URINARY SYSTEM.

The renal or emulgent veins terminating in the vena cava descendens, the kidneys must participate in the congestion of the systemic venous system arising from an impediment at the right side of the heart. These organs are affected more directly than the abdominal viscera, which are tributary to the portal vein. So soon as valvular lesions have led to the anatomical conditions involving an obstruction extending to the vena cavæ and their branches, renal engorgement necessarily ensues. Congestion of these organs is generally observed in examinations after death in valvular disease accompanied by dilatation of the cavities of the right side of the heart. Venous congestion, under

these circumstances, does not uniformly occasion a greater flow of urine than in health. Indeed, the quantity of urine is oftener diminished than increased, a fact going to show that the diuresis depends on the amount of blood conveyed to the kidneys by the arteries, or on conditions pertaining to the blood itself, rather than on accumulation in the renal veins. The urine is frequently scanty, even when the venous obstruction is sufficient to give rise to general dropsy. We may have albuminuria, owing to the mechanical pressure incident to venous congestion. It does not constitute evidence of structural changes of the kidney, or Bright's disease, when it is in small quantity, transient in duration, and notably fluctuating. (Flint.)

Moreover, hyaline casts are wanting when albuminuria is only a symptom of disease of the heart, and the specific gravity of the urine, instead of being diminished, is usually increased.

The degenerations of structure included under the name Bright's disease, are sometimes associated with valvular lesions of the heart.

The co-existence of structural degeneration of the kidney is shown, as already intimated, by the degree and constancy of the albuminuria, and by the different varieties of casts of the uriniferous tubes, which the sediment of the urine is found to contain when subjected to microscopical examination. The tendency to general dropsy is augmented by this complication; renal and cardiac dropsy are, in fact, combined. As regards the generative functions, Flint has observed, that in cases in which lesions had existed for a considerable period before puberty, the genital organs, including, in females, the mammary gland, attained to a full development.

SYMPTOMS AND PATHOLOGICAL EFFECTS REFERABLE TO THE COUNTENANCE AND EXTERNAL APPEARANCE OF THE BODY.

Lividity of the prolabia and face, which may be apparent over the whole surface of the body, denotes either venous congestion or imperfect oxygenation of the blood. The latter is incident to the pathological effects taking place in the lungs; the former, to obstruction at the right side of the

heart. But both conditions may be conjoined. A dusky hue of the face, combined with œdema, is quite distinctive of cardiac, as contrasted with renal, dropsy. I need not mention the painful expression of the countenance in a patient suffering from what is known as cardiac asthma. Dr. Hope gives a graphic picture of the terrible sufferings of such patients.

Some cases of valvular disease are characterized by pallor of the complexion. The co-existence of Bright's disease is likely to lead to this effect. But it is observed in some instances when the kidneys are not affected. It then depends on alterations of the blood proceeding from other causes.

An anæmic condition is incident, in a certain proportion of cases, to cardiac disease uncomplicated with an affection of the kidneys. Analysis of the blood shows a notable deficiency of albumen, together with a reduction in the relative proportion of blood corpuscles and fibrin.

The accumulation of blood in the right chambers of the heart induces, in addition to abnormal fullness of the superficial veins, a congestive state of the capillary vessels, causing the surface of the body to present an appearance like that produced by exposure to cold. The redness disappears on pressure, and returns, more or less slowly, after the pressure is removed. The appearance is not unlike that observed in typhus and typhoid fever, although the rationale is by no means the same.

Erythema, affecting portions of the surface, occurs in some cases not associated with œdema. The lower extremities are most apt to be affected. Flint met with an instance in which the extremities of the fingers and a portion of the palms presented permanently an erythematic redness. On the other hand, in a patient with considerable mitral regurgitation, the fingers at times were bloodless, being as pallid and cold as those of a corpse.

LECTURE XI.

VALVULAR DISEASES OF THE HEART.

Physical Signs and Diagnosis of Valvular Diseases of the Heart — Endocardial or Valvular Murmurs — Mitral Direct Murmurs — Mitral Regurgitant Murmurs — Aortic Direct Murmurs — Aortic Regurgitant Murmurs — Recapitulation of Murmurs — Purring Tremor — Diagnostic Characters of Mitral Lesions — Diagnostic Characters of Aortic Lesions — Of Tricuspid Lesions — Of Pulmonic Lesions — Treatment of Disorders Resulting from Valvular Lesions.

GENTLEMEN: We have thus far, in lecturing on Diseases of the Heart, gathered from the latest and standard works, together with our own observations, and have omitted much that might be said, while we have endeavored, by careful study, to give you, in few words, the prominent points which will aid you in the investigation of the diseases of the heart. Our clinics do not yet furnish us with opportunities in this direction, and for this reason have I taken special pains to treat the various affections in a plain and concise way. But you must not stop here, but investigate for yourselves.

We will devote this hour to the consideration of the

PHYSICAL SIGNS AND DIAGNOSIS OF VALVULAR LESIONS

Cardiac murmurs originate either within the heart, or on the peripheral surface of the organ.

In treating of endocardial murmurs, the practical points to be considered relate to the different character which they present, the morbid conditions which they denote, their significance and value as signs of disease, and their application to the diagnosis of valvular affections. These murmurs may be produced within the cavities of the heart, at the auriculo-ventricular or the ventriculo-arterial orifices, and within the aorta or pulmonary artery, near the junction of these vessels with the ventricles. It is practicable often, if not generally, to determine from which of the cavities, orifices, or vessels mentioned, emanate the murmurs heard in individual cases.

The importance of this localization, as pointing to the seat of the lesions which occasion the murmur, is obvious: to

determine the existence or non-existence of valvular disease; to determine the particular situation of structural lesions; to determine the character of lesions, and certain of their effects on the blood-currents through the different orifices.

Endocardial murmurs are not always due to lesions of structure or organic disease. They occur as a result of certain blood-changes and of functional disorder of the heart.

The latter are distinguished as inorganic murmurs, while those dependent on structural changes are called organic murmurs.

Organic murmurs, in the majority of cases, resemble a bellows-sound. Murmurs of this kind are said to be soft murmurs. In some instances they are so feeble as to be just appreciable. In other instances they are so loud as to be heard over the whole chest, and they are sometimes perceived by the patient, especially in the night-time.

Different varieties have been described and named from their resemblance to certain sounds. Enough for practical use is to consider them simply as presenting different modifications and degrees of roughness, the latter being the only distinctive feature worthy of being noted.

Murmurs sometimes have a musical intonation. The sounds have no special pathological or diagnostic significance, except that they denote the existence of organic disease.

The presence of a murmur involves only the fact that there is something abnormal. The presence of a murmur by no means warrants the conclusion, in all cases, that lesions do exist, as will appear more fully after the inorganic murmurs have been considered. The absence of murmur, on the other hand, warrants the conclusion that lesions do not exist, the probability of error being exceedingly small, provided the heart be not, from any cause, greatly enfeebled.

After the systolic contraction of the ventricles, the blood passes through the auriculo-ventricular orifices from the auricles into the ventricles.

The current of blood from the left auricle, through the mitral orifice, into the left ventricle, may be designated the direct mitral current.

The systolic ventricular contractions impel the blood from

the cavity of the ventricle into the aorta. The current of blood from the cavity of the left ventricle into the aorta may be distinguished as the direct aortic current. These are the normal blood-currents. If the mitral valves be insufficient, more or less of the blood contained in the cavity of the left ventricle is driven backward by the ventricular systole into the left auricle. Here, then, is a regurgitant current which does not exist when the valves are sufficient. It may be called a mitral regurgitant current. So may we have the aortic regurgitant current. Each of these four currents may give rise to a murmur. A mitral direct murmur begins after the diastolic, or second sound of the heart; or it takes place during the long silence or pause which separates the diastolic and systolic sound, and may be called the mitral diastolic murmur.

A mitral regurgitant murmur being produced by the ventricular systole, commences with the systolic sound; it is, therefore, a systolic murmur, and may be called the mitral systolic murmur.

An aortic direct murmur, also produced by the ventricular systole, is a systolic murmur; it commences with the systolic sound, and may be called the aortic systolic murmur.

An aortic regurgitant murmur, on the other hand, produced by a retrograde current from the aorta into the ventricle after the systolic contraction, commences with the second or the diastolic sound.

Then we have the systolic murmurs, commencing with the systolic or first sound of the heart:

1st. A mitral regurgitant, or a mitral systolic murmur.

2nd. An aortic direct, or an aortic systolic murmur.

Also the diastolic murmurs, commencing with or following the diastolic or second sound of the heart: 1st, A mitral direct, or a mitral diastolic murmur; and, 2nd, An aortic regurgitant, or an aortic diastolic murmur.

The mitral direct, or the mitral diastolic murmur, generally denotes a particular kind of lesion, namely, union of the mitral curtains, leaving a slit-like and more or less contracted aperture between the auricle and ventricle. It may be distinguished as a blubbering sound when this quality is

strongly marked. The mitral direct murmur always ends with the ventricular systole. This murmur may be produced —and it may be quite intense—when the mitral valves are not the seat of any lesion. The fact that the mitral curtains are floated out and brought into apposition to each other, by simply distending the ventricular cavity with liquid, is sufficiently established and easily verified.

Now, in cases of considerable aortic insufficiency, the left ventricle is rapidly filled with blood flowing back from the aorta, as well as from the auricle, before the auricular contraction takes place. The mitral curtains, under these circumstances, are brought into co-aptation, and when the auricular contraction takes place, the mitral direct current passing between the curtains, throws them into vibration, and gives rise to the characteristic blubbering murmur.

Mitral regurgitant, or systolic murmur, is most frequently met with in cases of organic disease of the heart. Whenever the mitral valve is insufficient, a portion of the blood contained in the left ventricle is driven backward by the ventricular systole into the left auricle.

The gravity of valvular lesions, as has been seen, depends on the amount of obstruction and regurgitation resulting from them; hence the importance of bearing in mind, that a mitral systolic murmur is not always, strictly speaking, a regurgitant murmur, that is, the murmur may be produced without regurgitation.

Aortic direct or systolic murmur. In proportion as obstruction to the aortic blood-current is involved, evils ensue, namely, accumulation of blood in the ventricular cavity, enlargement of the left auricle, followed by pulmonary congestion, and the more remote consequences which are essentially those resulting from obstruction and regurgitant lesions at the mitral orifice. There are no constant characters pertaining to the murmur itself which enable the auscultator to determine whether the lesions do, or do not, involve obstruction. In a large proportion of the cases of obstructive lesions at the aortic orifice, the valves are involved sufficiently to compromise, to a greater or less

extent, their function, and impair the intensity of the aortic second sound. Aside from attention to the aortic sound, the evidence of obstruction, and also of its degree and duration, must be derived from the amount of enlargement of the left ventricle, and the remote effect of the heart affection.

Aortic regurgitant or diastolic murmur. This ranks next to a mitral direct murmur as regards infrequency. The gravity of the lesions represented by this murmur depends on the extent of insufficiency or the amount of regurgitation. Absence of an aortic regurgitant murmur, therefore, is not positive proof that there is no regurgitation. Roughness of the inner surface of the aorta above the aortic valves may occasion a murmur with the retrograde movement of the column of blood within the vessel, although the aortic valves are sufficient. An aortic non-regurgitant diastolic murmur is then characterized by its ending abruptly with the second sound of the heart; whereas an aortic regurgitant murmur continues, more or less, after the second sound.

Localization of the systolic murmurs. The first point is to ascertain whether it be a systolic or a diastolic murmur. If the heart-sounds recur with great frequency, the difference in duration between the two pauses or intervals is scarcely apparent. Whenever there is doubt or difficulty in determining whether a murmur be systolic or diastolic, it is to be remembered that the first or systolic sound of the heart is synchronous with the apex-beat and the carotid pulse. If the beginning of a murmur be coincident with the carotid pulse, it is either an aortic or a mitral systolic murmur. A murmur may be inappreciable, owing to feebleness of the action of the heart. Before deciding, therefore, on the absence of murmur, it is sometimes advisable to excite the heart's action by muscular exertion. If the murmur be a mitral systolic, its maximum of intensity is at or near the apex of the heart. This is to be depended upon as a rule.

If a systolic murmur be an aortic direct murmur, its maximum of intensity is at or above the base of the heart. The particular situation where it is most intense is usually in the intercostal space nigh to the sternum. From the base

of the heart it is propogated upward for a greater or less distance, usually more so on the right than on the left side. It is often pretty loud at the sternal notch.

To determine the presence of both these murmurs: If a murmur heard at the apex be transmitted over the left lateral aspect of the chest, and if it be heard at the lower angle of the scapula behind, a mitral regurgitant murmur is present. If, now, a murmur heard at the base be heard over the carotids, there is also present an aortic direct murmur.

Localization of the diastolic murmur. A mitral direct murmur is pre-systolic. It occurs just before the first or systolic sound, and is almost always continued up to that sound. None of the other murmurs occur in the same relation to the first sound of the heart, and hence, this alone is distinctive. Its maximum of intensity is within a circumscribed space around the apex of the heart. If the diastolic murmur be an aortic regurgitant murmur, it commences with, and follows, the second sound of the heart. As no other of the four murmurs under consideration commences with the second sound of the heart, it suffices for its recognition to make out this point; and if it be difficult to determine which of the heart-sounds is the first, and which the second sound, the relation of the murmur to the second sound is shown by the interval between the murmur and the carotid pulse.

RECAPITULATION *of Points involved in the Localization of the Systolic and Diastolic Murmurs referable to the Mitral and the Aortic Orifice.**

SYSTOLIC MURMURS.

Mitral Regurgitant.	*Aortic Direct.*
Maximum of intensity at or near the apex of the heart.	Maximum of intensity at the base of the heart in the second intercostal space, near the sternum. Intensity diminished over body of heart and at the apex.
Comparatively feeble or wanting at the base.	
Not propogated above the base of the heart. Not heard over carotids.	Propogated above the base of the heart and generally heard over carotids.
Often heard over left lateral surface of chest.	Rarely heard over left lateral surface of chest.
If heard in the interscapular space, most intense near the lower angle of scapula.	If heard in the interscapular space, most intense as high as the spinous ridge of scapula.
Aortic second sound weakened in proportion to the amount of regurgitation, but distinct.	Aortic second sound often weakened, and more or less indistinct.
Pulmonic second sound often intensified.	Pulmonic second sound less frequently intensified.
Mitral valvular element of the first sound more or less impaired.	Mitral valvular element of the first sound not impaired.

DIASTOLIC MURMURS.

Mitral Direct.	*Aortic Regurgitant.*
Occurs just before the systolic or first sound, and ends with the occurrence of this sound. Usually vibratory or blubbering in quality.	Commences with and follows the diastolic or second sound. The quality usually soft.
Maximum of intensity over apex of heart.	Maximum of intensity over body of heart, near the sternum.
Generally not appreciable at the base of the heart.	Generally appreciable at the base of the heart.
Mitral valvular element of first sound impaired.	Mitral valvular elememt of first sound not impaired.
Pulmonic second sound often intensified.	Pulmonic second sound less frequently intensified.

In connection with murmurs, it may be safe to say, that they show organic lesions are accompanied by an organic murmur in the great majority of cases.

Lesions which occasion neither obstruction nor regurgitation may give rise to murmurs.

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* From Flint on Diseases of the Heart.

Purring tremor. This term is applied to a sense of vibration, or thrill, felt on placing the fingers or the hand on the præcordia. It resembles the sensation given to the hand by the purring of a cat. It is doubtless due to tremulous movements of the heart. A well-marked purring tremor may be considered as a sign denoting valvular lesions associated with hypertrophic enlargement of the left ventricle. It occurs when the mitral orifice permits free regurgitation, and may also occur in aortic lesions.

DIAGNOSTIC CHARACTERS OF MITRAL LESIONS.

Physical signs: — An endocardial systolic murmur is present in the majority of cases, with the traits which distinguish a mitral regurgitant murmur, viz.; its maximum of intensity at or near the apex of the heart, the intensity diminishing as the stethoscope is carried upwards over the body of the heart; generally feeble or lost above the base of the organ; not propagated into the carotids; often diffused over the left lateral surface of the chest; and not infrequently heard on the posterior surface, at the lower angle of the scapula, and in the interscapular space below the level of the spinous ridge of the scapula; the murmur more or less intense; generally soft, but sometimes rough, and occasionally musical. The aortic second sound is weakened; the pulmonic second sound is often intensified. Enlargement of the heart exists in the majority of the cases which come under observation.

Pain is rarely present. Abnormal force of the heart's action and palpitation denote consecutive enlargement, but the symptoms are often not prominent.

The pulse is small and weak, and, in an advanced stage, it becomes irregular and intermitting; inequality of the pulse is, in some measure, characteristic of obstructive lesions. Turgescence of the jugular and other veins, lividity, or cyanosis, and dropsy occur at an advanced period, when dilatation of the right cavities of the heart has been induced. Dyspnœa is more or less marked. Cough and muco-serous expectoration occur frequently. Hæmoptysis is of frequent occurrence, and extravasation of blood in the lungs, or pul-

monary apoplexy, takes place occasionally. Œdema of the lungs is not infrequent.

DIAGNOSTIC CHARACTERS OF AORTIC LESIONS.

Physical signs. — An endocardial systolic murmur is present in the majority of cases, with the traits which distinguish an aortic direct murmur, viz.: its maximum of intensity at the base of the heart; comparatively feeble and often lost at the apex; propagated upward in the direction of the aorta, and into the carotids; not diffused over the left lateral surface of the chest; and if heard on the posterior surface, either limited to, or most intense in, the interscapular space on and above the level of the spinous ridge of the scapula. Murmur more or less intense; generally soft, but sometimes rough. The aortic second sound of the heart is often weakened and indistinct; the pulmonic second sound is much less frequently intensified than in cases of mitral lesions. Enlargement of the heart exists in the majority of cases. An aortic regurgitant murmur is present in a certain proportion of cases.

Pain is oftener present than in cases of mitral lesions, but is often absent. Abnormal force of the heart's action and palpitation, as a rule, are more prominent symptoms than in cases of mitral lesions.

The pulse in cases of aortic regurgitation is quick, jerking, collapsing, and a longer interval than natural is sometimes observed between the apex-beat or systolic sound and the pulsation in remote arteries.

Visible pulsation of superficial arteries is frequently marked. Turgescence of the jugular and other veins, and dropsy, occur at a later period than in cases of mitral lesions, and oftener wanting.

Dyspnœa is less marked. Cough and muco-serous expectoration and hæmoptysis are comparatively infrequent. Pulmonary apoplexy rare. Œdema of the lungs less frequent.

DIAGNOSTIC CHARACTERS OF TRICUSPID LESIONS.

Physical signs.—The rule, that a murmur is present in the vast majority of cases, cannot be applied to tricuspid lesions; and hence, absence of murmur is not proof that the latter do not exist. A tricuspid regurgitant murmur, however, is sometimes observed. It is rarely intense or rough, and is usually low in pitch. Its maximum of intensity is at or above the xiphoid cartilage.

Tricuspid lesions, not congenital, are in most instances associated with lesions of one or more of the valves of the left side of the heart. One case is reported of the diagnosis being based on the fact that the presystolic murmur was heard, not only around the apex, but at, and to the right of, the ensiform cartilage.

Regurgitant and obstructive lesions, situated at the tricuspid orifice, do not produce those immediate effects on the respiratory system and the pulse which pertain to analogous lesions seated at the mitral orifice. Their immediate effects are manifested in the systemic venous system. Congestion of the systemic veins is a direct result, tending to general dropsy. Cerebral apoplexy is more liable than in mitral or aortic lesions.

DIAGNOSTIC CHARACTERS OF PULMONIC LESIONS.

Physical signs.—Lesions situated at the pulmonic orifice may give rise to a murmur with the first sound of the heart, which may be called a pulmonic direct murmur. This murmur has its maximum of intensity in the second intercostal space on the left side of the sternum, the situation where the pulmonic second sound of the heart may be isolated from the aortic second sound.

Pulmonic lesions, however, exclusive of congenital malformations, are so rare, that the opportunities of any clinical observer, however large his experience, for studying the physical signs, are extremely limited.

Hypertrophy of the right ventricle, which is produced by obstructive or regurgitant lesions of the pulmonic orifice, involves augmented intensity of the tricuspid valvular

element of the first sound, and an impulse in the epigastrium.

The primary effect of obstructive or regurgitant lesions situated at the pulmonic orifice, is enlargement of the right ventricle. The secondary and remote effects, and the symptoms thereon dependent, are essentially those which are occasioned by tricuspid lesions, being due to distension of the right auricle, tricuspid regurgitation, and congestion of the systemic veins.

TREATMENT OF DISEASES RESULTING FROM VALVULAR DISEASES OF THE HEART.

It is evident that the anatomical changes which the valves and orifices of the heart have undergone, are not amenable to any medical treatment. The lesions existing must remain. The most that can be done is to retard their progress and control their primary effects.

Cases may, however, occur where suitable remedies may set up such an action in the system, as may result in the partial or complete removal of certain morbid products deposited on or about the valves. A thorough trial of those remedies known to us as *antipsorics* may give you excellent results.

You need not feel discouraged in the treatment of valvular diseases, nor should you discourage your patients, for in general no immediate danger is present, even when those lesions exist which involve more or less obstruction or regurgitation.

For the treatment of the *primary* effects of valvular diseases, I refer you to the treatment of enlargement of the heart.

The *secondary* effects of valvular lesions do not generally appear so long as the enlargement of the heart is by *hypertrophy*, unless, from fatty degeneration or some other cause, weakness of the organ has been induced. Flint says that obstruction and regurgitant lesions tend first, as a rule, to produce hypertrophy, the muscular walls increase in thickness up to a certain limit. When this limit is reached, dilation of the cavities ensue, and, finally, predominates

over the hypertrophy. So long as the hypertrophy lasts the increased *power* of the heart compensates for the immediate consequences of the obstruction and regurgitation.

But when dilatation takes place, the real danger appears. It is then that other organs become affected, and a train of evils follow which will require your watchful care to relieve and arrest.

The main objects of *treatment*, before these resulting affections have appeared are mainly *preventive*. (1) You must seek to prevent or retard the progressive anatomical changes. (2) You must strive to prevent weakness and consequent dilatation of the heart.

As I have just now stated, you will find this treatment fully set forth in your notes on hypertrophy and dilatation.

You must ever bear in mind, that in the treatment of the secondary and remote effects of these lesions, the *condition of the heart* should not be forgotten. You cannot successfully treat the local congestions in such cases by specific remedies directed solely to the organ affected. For example, *leptandra* will not as often remove a jaundice caused by cardiac disease as will *digitalis*, because the latter has a specific influence over the heart.

These secondary affections are mostly dependent on *passive* congestion, and as they arise from a weakened circulation, those cardiac remedies which strengthen the force of the circulation will give the most relief. I have enumerated these in Classes I., II., and III. in "Dilatation."

Dyspnœa, otherwise known as cardiac asthma, or breathlessness, will often claim your special attention. In advanced cases you can only palliate, but you can do much with such medicines as *digitalis*, *hydrocyanic acid*, *arsenic*, *lobelia*, *cuprum aceticum*, *phosphorus*, and *tartar emetic*.

Cough can be alleviated by the same remedies, aided by *hyoscyamus*, *conium*, *lycopus*, etc.

Expectoration in valvular disease should be encouraged rather than checked, for it often relieves the congestion. When it becomes too profuse, it may be lessened by *squilla*, *tartar emetic*, *cubebs*, *copaiva*, *ammonia*, *ipecac*, and similar remedies.

Intercurrent pulmonary affections, such as bronchitis,

pleurisy, pneumonia, are to be treated in the ordinary manner.

The *disorders of digestion* and *hepatic affections* are sometimes quite obstinate. If you will study the provings of *digitalis*, you will observe the peculiar and prominent derangement of the gastric and hepatic functions which it causes. It causes these disorders by deranging the action and impulse of the heart. *Digitalis* is our most reliable remedy in similar cases; and next in value come *nux vomica*, *ignatia*, *china*, *cornus*, *æsculus*, *hydrastis*, *podophyllum*, *leptandra*, *lycopodium*, *sulphur*, and *benzoic acid.*

Cerebral congestions are to be met with *digitalis*, *nux vomica*, *opium*, *glonoine*, *agaricus*, *arnica*, *solanum*, aided by hot mustard foot and hand baths. The extremities must be kept warm and full of blood.

General dropsy is one of the most troublesome of the secondary effects, and will tax your skill greatly. Remember that the *kidneys* are not primarily in fault. The co-existence of Bright's disease gives the disease a double character.

Any remedy which will aid the heart by giving it increased power will benefit the dropsy. It is not necessary that the remedy should be a kidney remedy. The best remedies for cardiac dropsy may be arranged in two classes, namely:

I. Those which act primarily on the heart: *digitalis* and its analogues; *nux vomica* and *china* and their analogues.

II. Those which act specifically on the kidneys: *apocynum cann.*, *asparagus*, *eupatorium purp.*, *benzoate of ammonia*, *colchicum*, *asclepias syriaca*, *squilla*, *potass nitras* and *acet.*, etc.

In cases of co-existing Bright's disease, I have found *sulphuric acid* to act in a wonderfully efficient manner.

It is a significant fact that allopathic authorities are quite unanimous in asserting, that from experience they find that by combining a remedy of my Class I. with one of Class II., they are enabled to remove cardiac dropsy more rapidly than in any other way. A favorite combination with them is *digitalis* and *squills*. Now, we need not combine medicines to get these good effects. Better results can be gained by alternation. You will, according to my experience, get

prompt action from an alternation of *digitalis* and *apocynum cann.*, or *china* and *asclepias*, or *nux* and *benzoate of ammonia.*

Obstinate cases have been reported where the internal administration of remedies failed to remove this form of dropsy, but in which their *external* application over the abdomen and kidneys was successful.

If your dropsical patient is anæmic, give him *ferrum* (the *iodide* is the best,) and advise a strong nitrogenous diet.

Finally, gentlemen; do not always inform your patients of the presence of organic disease of the heart. Such an announcement will militate against your best chosen remedies, by depressing your patient's spirits, and thus lowering the vital energies. Better is it to encourage; and only allude to the heart in a vague or indirect manner.

PART IV.

MATERIA MEDICA OF HEART REMEDIES.

ADONIS VERNALIS.

This remedy, like Convallaria, comes to us from Russia, and, like many of our best remedies, was first used by the common people as a remedy in dropsy and heart disease. Experiments were first made by Dr. Botken, the results of which were described by Dr. Butnon in a graduating thesis. The experiments made on both cold-blooded and warm-blooded animals with different preparations of *Adonis* (infusion and both aqueous and alcoholic extracts) showed that its action is to stimulate both the inhibitory apparatus and motor ganglia of the heart, to increase the contractility of the cardiac muscle, and to cause the contraction of small arteries in different parts of the organism without affecting the vaso-motor centre.

Under its influence in cases of *dropsy* the cardiac contractions increase in force, the pulse becomes less frequent, more regular and full, the urinary secretion increases from 200 to 2,000 or 3,000 cubic centimetres, and albumen and casts disappear from the urine.

In cases where the dropsy was due to a disturbance in the compensation and activity of the heart this remedy acted very satisfactorily. The heart-beat increases in force, and the size of the heart rapidly diminishes; the heart-sounds and murmurs, especially the presystolic and systolic in stenosis, are more marked and distinct. The heart-rhythm is more regular and somewhat slower; therefore the pulse is slower, and in most cases the pulse-wave fuller and slower. The urine increases from 300 to 3,000 cubic centimetres, a tenfold increase of the watery element. All deposits disappear, the specific gravity diminishes, and the urine has a very pale color. There is an absolute increase of the chlorides and urates, the body weight diminishes, and the œdema decreases rapidly; the dimensions of the liver increase, cyanosis and dyspnœa disappear, and respiration becomes full and regular.

In the largest number of cases great relief was experienced at the end of the first day. Complaints were less frequent, and in the course of a few days disappeared entirely.

These clinical results were obtained in hospital practice, where the cases were closely and carefully watched.

It is indicated in cases of (a) *endocarditis*, with *valvulitis*, when the heart-muscles are endeavoring to overcome the valvular obstruction and need the aid of specific remedies to increase the tonicity of those

tissues; or (b) when there is impending or actual dilatation of the heart from a giving way of the muscular fibres. This condition is marked by diminished force of the heart's action, with lowered blood-pressure everywhere, especially in the kidneys, decreasing their functional activity.

It has been found equally potent in *secondary* heart disease, following Bright's disease, when we find a diminished action of the heart, pulse irregular or intermitting, passive venous stasis, dropsy, etc. A typical case from these hospital records is as follows: A common laborer, with chronic valvular disease, with dilatation. After the use of *Adonis* the heart diminished in size, the congestion of the lungs, well marked, almost disappeared, the œdema of the legs and the ascites disappeared entirely, palpitation of the heart and dyspnœa diminished so much that the patient was discharged from the hospital and returned to work.

The *dose* of *Adonis*, when given in infusion (1℥ of the herb to 12℥ of water), is a tablespoonful every two hours in severe cases; in chronic cases every four hours. Of the fluid extract the dose is one to two minims, or increasing from 5 to 10 drops.

By the above it is seen that *Adonis* is quite similar, if not identical, in its action on the heart to *Digitalis* and *Convallaria*. The symptomatic differences have not yet been brought out by any physiological provings. We can resort to it when, as is often the case, the two medicines above named fail to act favorably, or cease to give the patient relief. It is said to be more liable (than Digitalis) to cause gastro-intestinal irritation, nausea, vomiting and diarrhœa, in large doses.

In experiments made on frogs, in both the isolated heart and the heart *in situ*, diastole ends the scene. Two questions now arise, namely: What is the cause of this stoppage in diastole, and what produces theslowing of the cardiac rate occurring in the heart when lying in its sac?

The diastolic arrest of the isolated heart can only be due to one of two things—either the inhibitory cardiac apparatus is stimulated, or the heart-muscle and its motor ganglia are depressed. The latter seems far more likely, not only from analogy, but from the fact that in the experiments performed on the non-eviscerated heart of frogs the inhibitory nervous apparatus was found to be stimulated centrically and not peripherally; and, furthermore, the very character of the slowing of the isolated heart showed it to be due not to stimulation, but to increasing depression.

That the vagi are not stimulated peripherally by this drug at any

time was proved by the following experiments, and also by the results of the observations on the action of the drug upon dogs, which will be described farther on.

If the inhibitory nerves be cut before the Adonidin is placed in the pericardial sac, the usual increase in rate under such circumstances takes place, and the addition of a small quantity of the drug now immediately increases the rate still further, without the appearance of any primary stage of slowing of rate. This proves that the primary slowing occurring when the vagi are intact must be due to exaltation of their function, and also proves that the drug must directly stimulate the heart-muscle; for the rapid rate under these circumstances is not one of weakness, but of power. It should not be forgotten that this drug in large quantities finally stops the heart in diastole, whether the vagi are intact or divided. In small quantities it does not produce the primary slowing of the pulse, nor does it bring on the peculiarly weak and imperfect movements which have already been described as occurring before death. In other words, it requires large doses to affect the pneumogastric, and large doses to depress the heart-muscle.

One more point is to be decided. Is the rapid stage following the primary slow stage in the viscus *in situ* due to paralysis of the vagi, to direct stimulation of the heart which overcomes inhibition, or to both? While I am unable to state whether overstimulation takes place, it is a fact that the pneumogastric nerves are certainly in this second stage depressed by the drug, for galvanization of these nerve-trunks during this stage failed to produce as marked a slowing of rate as should have occurred, provided the inhibitory pathway was open. From this point we may conclude that although the stimulation of inhibition in the first stage is centric, the paresis of inhibition in the second stage is peripheral.

The same changes are present when the drug is injected into the posterior lymph-sac of a frog. The animal soon becomes passive and immovable, and dies shortly so quietly that its death is not noted until he is handled. That the high arterial pressure produced by this drug is due in part to centric stimulation of the vaso-motor system is proved by the fact that the mesenteric bloodvessels are seen to dilate after section of the spinal cord.

Further evidence of this fact was adduced when studying the influence of the glucoside on the circulation of mammals; for there is but little, if any, difference in the action of Adonidin on the dog and frog. The injection of the quarter of a grain of Adonidin into the jugular vein of a dog, weighing twenty-five pounds, causes a great increase of cardiac force and arterial pressure and a marked decrease

in pulse-rate. Following this stage of exaltation of force and pressure come a marked fall of arterial tension and, as is usual, a decrease of pulse-force, with an increase of pulse-rate. This condition remains the same for some time, until at last the heart beats irregularly, and stops in diastole, just as did the heart of the lower animals. We have, therefore, several stages to be accounted for in the action of this drug in the dog, viz., the increase in arterial pressure, in cardiac force, and decrease in pulse-rate in the first stage; the fall of arterial pressure and force and increase of pulse-rate in the second stage, and the arrest of the heart in diastole at the end of the third stage. Turning attention to the rise in arterial pressure, the writer eliminated all danger of a rise due to asphyxia by curarizing the dog, artificial respiration being maintained. Under these circumstances arterial pressure was increased as greatly as when the animal was not curarized. What, then, is the cause for this rise in arterial pressure? Probably two factors lie at the bottom of this condition, namely, centric vaso-motor stimulation, aided by increased cardiac force; for when the spinal cord was divided high up in the cervical region, thereby producing vaso-motor palsy, the rise in pressure under the influence of Adonidin was of course less marked, and the rise which did occur must have been due to increased cardiac force. The experiment on the fourth dog was made to discover how the slowing of the pulse was produced in the first stage. One-fourth grain of the drug was administered in the same manner as before, the animal having first been curarized. No sooner was the slowing of the heart-beat most marked than the vagi were divided, and instantly the pulse was increased from 102 to 192 per minute, proving that the slowing was due to stimulation of inhibition, and that this stimulation was centric. The increase in force has already been shown to be due to a direct stimulant action of the drug on the heart itself. In regard to the symptoms of the second stage, we find that the fall of arterial pressure is due to palsy of the vaso-motor system, since, when the cord is intact, galvanization of the sciatic nerve or asphyxia did not bring about increased pressure.

The decrease in pulse-force is due to the depressing action of the drug on the heart itself, as is also the arrest in diastole. The increase in pulse-rate is due to inhibitory failure; for in the dog, as well as in the frog, galvanization of the vagi failed to slow the heart. In the next experiment the dose of the drug used was much smaller than before, since it had become evident that the larger doses were absolutely toxic in their character. An eighth of a grain was, therefore, injected into the dog's jugular vein, curare and artificial respiration being used. As a result, I found that in small doses this glucoside does not cause

any primary slowing of the heart, but increases its frequency, its force and the arterial pressure from the first, all three of these features being permanent and constant under the smaller dose. Even with this dose, however, the animal died. A twelfth of a grain given slowly to a large dog did not produce death nor a primary slowing in rate, but seemed to increase the rate, force and pressure. In this last experiment no tracing was taken, the jugular vein only being exposed. I should have stated before that when I poisoned a small dog by a large dose of Adonidin there were symptoms of nausea and intestinal spasm, accompanied by the expulsion of fæces. The animal had no convulsions or spasms, but lay on its side, with pupils widely dilated, and, when death occurred, respiration continued some moments after the heart stopped. The same writer thinks that Convallaria and Caffeine possess higher diuretic powers and less cardiac influence than Adonidin.

Finally, he sums up the results of his observations as follows:

In doses of $\frac{1}{8}$ gr. Adonidin—

1. Increases arterial tension.
2. Regulates the heart-beat.
3. Diminishes the frequency of the pulse.
4. Increases the force of the cardiac contractions.
5. Acts with rapidity, its effects being only present during its administration.
6. Increases diuresis.
7. Is well tolerated.
8. That the indications for its use are the same as for Digitalis.

OTHER EXPERIMENTS WITH ADONIDIN.

Huchard presented, in the Société de Thérapeutique, at a meeting held on December 23d, 1885, a series of cardiographic and sphygmographic tracings taken from patients under treatment with Adonidin (vide *Gaz. Hebd.*, January 1st, 1886). Our readers will recall that Adonidin is the glucoside of Adonis vernalis, and was first extracted by Cervello as an amorphous yellowish extract of a bitter taste. The first experiments with the drug were made by Lesage and Montague. The cardiac frequency was found under its influence to be decreased, and at the same time a peculiar state of ventricular rigidity is induced, the ventricle itself becoming pale and anæmic.

Huchard injected 1 to 2 cg. ($\frac{15}{100}$ to $\frac{3}{10}$ gr.) hypodermically into rabbits, and found respiration reduced, the cardiac force raised, disappearance of paralytic symptoms, fall of temperature, and death ensuing after fifteen to twenty hours. In man the infusion of Adonis

vernalis may be given in 4 to 8 grammes (1 to 2 dr.) for a dose, four times daily, or, still better, in pill form, 4 to 5 daily, $\frac{1}{10}$ of a grain each. Huchard reported several cases in which Adonidin had been successful. In one case of interstital nephritis, with galloping heart-sounds, anasarca and beginning asystole, in which Sparteine had been given in vain, Adonidin induced a profuse diuresis and an unquestionable improvement in the patient's condition. For some time, however, the drug had to be discontinued, on account of the diarrhœa and vomiting it produced. When the quantity of urine fell off again, the remedy was again exhibited, and again relieved the most urgent symptoms. The diuresis rose two to four quarts daily. At the same time the arterial pressure grew stronger, the pulse more regular and full, and the œdema and cardiac frequency receded. In a woman having a mitral affection, but no heart-murmur, the drug produced a very audible systolic murmur. In typhoid fever, where great reduction of the arterial pressure exists, Huchard thinks the drug might be used advantageously to raise the pressure.

ADONIS ÆSTIVALIS.

This plant has been examined by Italian doctors as to its therapeutic value, and Albertoni reports in its favor. His experiments were made on animals and sick and healthy people. In cases of insufficiency of heart action, with feeble, irregular, rapid pulse, diminished arterial pressure, dyspnœa and diminished excretion of urine, the administration of the plant in substance produced in a few days the return of normal pulse, increase of the pressure of the blood, and disappearance of the respiratory oppression. The quantity of urine increased from eight hundred to three thousand cubic centimetres in a day.

These good results were not obtained in cases in which the organs susceptible to the influence of Adonis, such as the kidney epithelium, muscular fibre and the nerve apparatus of the heart, had already retrograded to too great an extent.

The dose is 4 to 8 grains a day, given in substance or infusion. The effects manifest themselves about the third day.

Neither of these species of Adonis has been proved in our school. There were some attempts to prove Adonis vernalis, but the results were very meagre. It seems to cause irritation of the bladder, strangury, etc., but all cardiac medicines do that.

BARIUM AND ITS SALTS.

Barium has not yet been used as a remedy in cardiac affections, but it has a decided action on the heart and capillary vessels.

The provings already show this, and also show that, like Digitalis, its primary action is to stimulate the cardiac muscle, and, secondarily, to depress its vitality. The symptoms in a fatal case of poisoning by Baryta acet., reported by Dr. Dartmoor, are: "Pulse 125 to 130, very small and frequent. Pulse 65. Pulse 56, and even as low as 25. Irregular pulse."

Baryta carb. has: "Violent, long-lasting palpitation. Palpitation when lying on left side. Palpitation renewed when she thinks of it. Pulse full and hard."

Baryta mur. has: "Beating of the heart very irregular. Pulse scarcely perceptible. Pulse rapid. Pulse soft and irregular."

Brunton, in his experiments, found Barium to act as energetically as Veratrine. He classes it with Digitalis, Helleborine, Nerein, Scillin, Strophanthus, Caffeine, etc.

Hahnemann says the Baryta salts are useful in the maladies of old age. The condition of the heart and bloodvessels of the old is certainly similar to what we might expect the secondary symptoms of Baryta to be. I shall not be surprised if we find in Baryta the remedy for many cardiac disorders which accompany old age. In senile or fatty degeneration it may rival Digitalis or Strophanthus.

The following statement of its action on the heart and circulation is certainly worthy our study:

SIMILARITY OF BARIUM TO DIGITALIS.

"The salts of Barium, though they have been occasionally employed therapeutically, have never been very generally recognized as really useful therapeutic agents, either in this country or abroad, partly perhaps from a want of knowledge as to their effects both in physiological and pathological conditions. This knowledge Dr. A. Bary, of Dorpat, has recently endeavored to supply, to some extent at least, by making a large number of investigations on the action of the Barium salts on animals, as well as by collecting recorded cases of the therapeutical employment of the drug or its accidental effects as a toxic agent in the human subject. The salt he mainly used was the chloride, a substance with which every one is perfectly familiar in the laboratory, if not in the dispensary. The chief action of Barium appears to be

on the heart, showing great similarity to the action of Digitalis, and somewhat less to that of Physostigma. Thus it was found by experiments on frogs that in small doses Barium increased the action of the heart-muscle, and in large doses set up peristaltic movements, arresting the heart finally in systole, this arrest in systole being a tetanic spasm of the heart-muscle, and being capable of being brought to an end by agents which paralyze muscles and by mechanical distension by fluid pressure, but not by the electric current or by Atropin. In very acute poisoning, either by large doses or by the direct application of the Chloride of Barium to the heart, the frog was found, even after the heart had stopped, to be capable of jumping. Again, the isolated apex was caused to beat by Barium, finally being arrested in systole. The arrest caused by Muscarine and Chloral was brought to an end by using this salt. It was found that arrest in diastole could not be produced under its action by stimulation of the vagus or of the sinus venosus. The effects of Barium on the arrest caused by Muscarin, and the want of result from irritating the vagus, were found not to be due to any paralyzing action of the salt on the vagus. The foregoing effects are as nearly as possible identical with those produced by Digitalis, differing also only in a slight degree from those of Physostigma. In warm-blooded animals Barium in small doses slows the pulse independently of the inhibitory apparatus. In large doses it first accelerates the pulse, probably by stimulating the accelerating nerve, and finally slows it, in consequence of weakness of the heart. The blood-pressure is greatly increased by Barium. Like Pilocarpin, Barium increases in a marked manner the secretion of saliva, but only when it is injected into the veins, this activity being immediately checked by Atropin, differing in this latter respect from Physostigma. In view of the considerable contraction of the vessels caused by the Chloride of Barium, Professor Kobert has recently made some trials of its use in cases of dilated cutaneous veins, employing it in the form of ointment.

"The cases were one of caput medusæ following renal tumor and a case of long-standing dilatation of the veins of the inner aspect of the thigh in a patient with cardiac disease.

"No beneficial effect was obtained. It is, however, probable that by extended observations on physiological principles some valuable therapeutical uses may be found for Barium."

CACTUS GRANDIFLORUS.

This cardiac remedy was first used by our school, and for twenty years or more we were the sole prescribers of it.

For the last five years other schools have used it, first the eclectic, and now the regular. The late Austin Flint, in his Clinical Medicine, mentions Cactus as "a valuable cardiac nervine and tonic, in five minim doses." Dujardin Beaumetz, of France, quotes from Dr. Goss (Mat. Med.) and Dr. Kunze (New Preparations) several cases of palpitation, hypertrophy, etc., in which Cactus proved of value.

It is singular that F. Lauder Brunton did not appropriate it, together with his wholesale filchings from our Materia Medica. It is now used very extensively by all schools, but I doubt if it has come up to the expectations of some members of our school of practice.

It was heralded by the most fulsome laudations of its great value, not only in diseases of the heart, but in all other acute inflammations. I do not remember, however, to have seen any recent record of diseases other than disorders of the heart cured by the Cactus.

It is my opinion, from careful observation and study of its action, that all the symptoms and conditions caused and cured by Cactus are due to its affinity for the heart and its pathogenetic action thereon.

It appears to me that its action on the heart is that of an intense irritant of the ganglia of that organ. It may thereby cause the several conditions of hyperæsthesia, irritability, neuralgia, spasm, irregular action, and, finally, inflammation. It differs from Digitalis in this, that it seems to have an action on the spiral fibres of the muscular tissue of the heart, while Digitalis acts on all the muscular fibres alike.

Cactus is capable of causing carditis and pericarditis; Digitalis is not. Cactus resembles Bryonia, Aconite and Spigelia more than it does Digitalis. In only one condition does it resemble Digitalis, namely, cardiac failure, and in both the failure is a secondary effect.

I wish to call your attention particularly to the hæmoptysis of Cactus. It is not indicated in spitting of blood, unless it is caused by an excited action of the heart acting on pulmonary vessels weakened by disease.

In hæmoptysis, with weak small pulse, it is not indicated; but if the heart's action is hard, tumultuous, and the pulse similar, then Cactus will arrest it. The blood must be bright and fluid (arterial).

It is recommended in pneumonia and pleuritis, but has not attained any popularity in those diseases. In the few cases reported the pulse was hard, vibrating, 120.

I suspect in all cases where it is useful some cardiac inflammation

or abnormal excitement must be present as a complication or as a cause. The bronchitis and asthma in which it is indicated are, without doubt, always a cardiac complication.

The characteristic symptom of Cactus heart trouble is "a sensation as if the heart was constricted as by an iron band." This sensation is very distressing, and whenever felt is a pretty sure indication for this remedy, or for Iberis, Arnica and sometimes Digitalis, but, in a less degree, valvular diseases of the heart may be palliated by Cactus in a large proportion of cases, unless the disorganization is too far advanced, when Digitalis will be of greater service.

Hypertrophy with enlargement is more under the control of Cactus than is hypertrophy with dilatation, which is just the reverse of Digitalis, Iberis or Lycopus.

For the numerous cases cured or relieved by Cactus, see the extended collection made in the fourth edition of Symptomatology of New Remedies, which I copy: Sensation of constriction in the heart, as if an iron band prevented its normal movement. This sense of constriction seems to affect all portions of the body.

Dr. Farrington writes me that "A very intelligent lady, who for years has used Homœopathy, took many doses of Cactus 30. She complained of irresistible inclination to cry. She felt as if her whole body was in a wire cage, and that each wire was being twisted tighter and tighter." Dr. F. also sends me a case of rheumatism of the diaphragm, cured by Cactus 30th and 200th.

The symptoms were "constriction around the lower part of the chest, as from a cord, the constriction marking the periphery of the diaphragm; jerking breathing; sharp pains shooting through the body toward the back and upward into the chest, with sensation of rush of blood to the chest." The C. bonplanti and another species have lately been used successfully in place of C. grand.

Palpitation of the heart continues day and night, worse when walking and at night, when lying on left side.

Functional disorder of the heart from mental emotion, aggravated at the menstrual period.

Angina pectoris.

Palpitation acute and chronic, even in organic diseases of the heart.

Acute inflammatory affections of the heart, idiopathic, and even from rheumatism.

Acute carditis, with blueness of the face; oppression of breathing; dry cough; pricking pain in the head; cannot lie on left side; pulse quick, throbbing, tense and hard.

Chronic carditis, with œdematous and cyanotic face, suffocating

respiration, continued dull pain in the heart, dropsical effusion throughout the body; cannot drink or speak; hands and feet cold, pulse intermittent.

Hypertrophy, with dilatation; patient is pulseless, extremely exhausted, panting and sad; cannot lie down or speak; has scarcely slept for fifteen days; forgetful; feet œdematous. (Is soon relieved, lies down and sleeps twelve hours.)

Organic diseases of the heart; valvular diseases (an invaluable palliative for many distressing symptoms).

A constant fluttering sensation in the stomach over the location of the cœliac axis, in a spot about the size of a dollar; a burning line extends down from it to the lower ribs on either side; a hot flash shoots downward frequently (cured by a few doses).

Rheumatic inflammation of the heart with severe pains in the apex of the heart, and pain shooting down the left arm to the ends of the fingers; dyspnœa, pulse feeble, 120, etc.

Palpitation of the heart from any exertion, with excessive pain over the left side, between the scapulæ and sacral region. A whizzing to-and-fro sound, or bruit desoufflet.

Endocardial bruit, increased præcordial dulness, excessive impulse of the heart's action, and evident enlargement of the right ventricle.

Great irregularity of the heart's action—intermittent at times and of varying character—great frequency of action, alternating with slowness. (Enlargement of left ventricle, with great irritation of the cardiac nerves.—Sandford.)

Irregularity of the heart's action from reflex irritation.

Palpitation, with vertigo, dyspnœa, loss of consciousness.

The following is Dr. Hughes' estimate of the drug:

"Dr. Rubini, after observation of the physiological and therapeutical effects of the Cactus for ten or twelve years, published a pamphlet containing the results of his experience.

"It was translated by Dr. Dudgeon for the *British Journal of Homœopathy*, in whose twenty-second volume it may be found. It contains numerous symptoms observed on the healthy (subjects and doses not specified), and as many cured in the sick. Some later provings from four sources are incorporated with Dr. Rubini's results in Allen's Encyclopedia; and Dr. Hale, in the article on the drug in the second edition of his New Remedies, has collected all the clinical experience with it, which had appeared in print up till that time (1867).

"From Dr. Rubini's provings it would appear that Cactus has a very powerful action upon the heart and arteries, closely resembling

that of Aconite. General rigor, followed by much heat and sweat, even recurring daily at the same hour, and symptoms—as pain and hæmorrhage—of acute congestion in the head and chest, attest its action on the arterial system; while the heart gives evidence, in pain, palpitation, oppressed breathing and constriction about the chest, of being unusually affected. The pulsation in the scrobiculus cordis so characteristic of cardiac disorder is markedly produced by Cactus. It causes also painful pressure on the vertex; acid risings from the stomach, with sense of weight there; severe twisting colic, with heat (external and internal) of the abdomen, bilious diarrhœa, with pain before the stools; inflammatory strangury, followed by copious urine, loaded with lithates, and painful menstruation. There is great prostration, and the mental condition is one of profound melancholy.

"From such a pathogenesis as this brilliant results might be anticipated. Dr. Rubini assigns to it a wide range of curative power. 'The characteristic feature of the Cactus consists in this, that while it develops its action specially in the heart and its bloodvessels, dissipating their congestions and removing their irritations, it does not weaken the nervous system like Aconite;' so he writes in the preface to his provings. I must differ from him about Aconite weakening the nervous system. It need never do so, if the dose be not too large. But, if Cactus acts in this manner, it may be a formidable rival to Aconite, as it would obviously be used in the same class of cases.

"It is said to have cured with striking rapidity acute otitis, acute and even chronic bronchitis, pleurisy, pneumonia, hæmatemesis, gastro-enteritis, hepatitis, hæmoptysis, hæmaturia and a quotidian ague. These experiences have yet to be confirmed. For my own part, when I meet with these acute fevers, congestions and hæmorrhages, I seem quite content with my tried and valued Aconite, and am loth to experiment with any other medicine.

"It is otherwise in affections of the heart, where Cactus appears to exert a power beyond that of Aconite and to fill a place hitherto vacant. It seems beneficial in all overactions of this organ, from nervous palpitation to acute carditis; in the distress arising from hypertrophy, and in the severe sufferings incident to valvular disease. (See an excellently narrated case by Dr. O'Brien in the tenth volume of the *Monthly Hom. Review.* Dr. Meyhoffer's experience with Cactus in cardiac affections, as related in his contribution to the Transactions of the Paris Congress of 1878, is also worth consulting.)

"Perhaps also in angina pectoris and in chronic palpitation it generally gives rapid and lasting relief. The feeling as if the heart were grasped and compressed as with an iron band (probably spasm)

is very characteristic of Cactus in these cases, and is well marked in its pathogenesis. It would probably be beneficial, at least to relieve pain, in internal aneurisms.

"Dr. Lippe states that he has frequently cured with Cactus the pressive headaches in the vertex, so often met with as a result of menorrhagia. I myself place much reliance on it in the similar headache of the menopausia.

"Dr. Guernsey says that the constrictive sensation, as of an iron hoop, caused by Cactus in many parts of the body, is an unerring indication for it in practice. This statement has been confirmed by many observers. Among them is Dr. Wallace McGeorge, whose communication on the subject may be read in the eleventh volume of the *Hahnemannian Monthly* (p. 507). He relates an instance of vaginismus in which, led by this characteristic, he prescribed Cactus with success.

"Dr. Farrington mentions another of rheumatism of the diaphragm, where the same constrictive sensation was prominent, and where the remedy proved equally potent. The great analogue of Cactus is obviously Aconite. Its influence on the heart resembles that of Naja.

"Dr. Rubini recommends the mother tincture in acute inflammations and organic diseases of the heart. In its nervous affections he states that the higher dilutions act well."

[In the tenth volume of Allen's Encyc. Mat. Med. will be found the original provings of Cactus by Dr. Rubini. It is very interesting reading.]

The "sense of constriction," mentioned as a keynote symptom, is trustworthy. It is sometimes a sensation as of spiral constriction (the spiral muscles of the heart cause that sensation). The uterus, bladder, and all hollow organs have these spiral muscular fibres. I once suffered during sciatica with a disagreeable twisting, constrictive sensation in the muscles of the thigh. Cactus removed it, I think, for that time.

Three other species of Cactus have been proved, namely, Cereus bonplanti, Cereus serpentinus and Opuntia vulg. C. bonplanti was proved by Richard E. Kunze, M.D., an eclectic physician, and published in a "Monograph."

The general symptoms bear a resemblance to Cactus grand. Eclectic physicians use it largely in cardiac diseases, and I find it almost equal to the C. grand. in many cases. The heart symptoms differ in expression from those of Rubini, but probably mean the same. Thus, we have under C. bonplanti:

"Severe agonized pain at the heart; severe convulsive pain in heart; sensation of a great stone on the heart; sensation as if the chest was

'broken out' (fractured and pushed out?) just in front of the heart; feeling as if the heart was transfixed by a blunt instrument as on a bolt; pulse irregular and intermittent." Besides, the prover had severe pains in the left side of the chest and oppression of respiration. The eye symptoms remind one of Spigelia. "He had a good deal of occipital headache. The sexual organs were primarily excited and secondarily depressed." (This is also caused by the other Cacti.)

The heart symptoms of C. serpentinus are not as well marked, but there are "pain in the heart, with shortness of breath," and "sharp, thrusting pain in the heart." Opuntia vulg. was proved by Dr. Burdick and others. They had severe heart-pains and oppression, but the doses taken by the provers were too small to produce any violent effects.

Dr. Burdick claims to use this successfully in diarrhœa, with nausea extending from the throat, down through the stomach and bowels.

It is probable that all the Cacti, like all the Liliaceæ, have a direct affinity for the heart and sexual organs. Even the Cochineal insect (Coccus Cacti), which feeds on a cactus, has many cardiac and genital symptoms, which remind one of the Cactus provings.

CAFFEINE.

Caffeine has for its formula: $C_2\ H_{10}\ N_4\ O_2$. It was found in coffee by Rung in 1820. Jobat and Mulder in 1868 showed that Theine, which Oudry had extracted from tea in 1827, has the same composition as Caffeine. Guaranine, discovered in 1840 by Martin, is also identical with Caffeine; it is the same with Mateine, obtained in 1843 from Paraguayan Maté. Caffeine crystallizes in fine silky needles, is very bitter, soluble in 80 parts cold water and 60 of gastric juice. It is contained in variable quantities in different kinds of coffee, a quantity which varies from 0.67 to 2.21 per cent. Thus raw Java has 2.21 per cent., Costa Rica, 1.18; Alexandria Mocca, 0.84; Native Ceylon, 1.57; Surinani (first quality), 1.78, etc. In tea it varies from 1.6 to 2.9 per cent.; good black tea (Kiatchi or Canton) containing about 2 per cent., and green tea a little less. (Theine is not Caffeine. *Hale.*)

Tanret has shown that the greater part of the supposed salts of Caffeine (valerianate, lactate, bromhydrate) does not exist. He has, however, shown that Caffeine forms with benzoate, cinnamate and salicylate of sodium salts very rich in Caffeine.

Cinnamate of Sodium dissolves Caffeine in water equivalent for equivalent: 170 of Cinnamate for 224 of Caffeine. This double salt contains 58.9 per cent. of Caffeine.

The Benzoate of Soda and Caffeine contains for 2 equivalents of Benzoate of Soda (288) one equivalent of Caffeine (244), or 45.8 per cent.

Salicylic acid gives us a soluble salt which is exceedingly rich in Caffeine. One equivalent of Salicylate of Sodium (160) gives solubility to one equivalent of Caffeine (244), making the resulting salt the richest of all the double salts in Caffeine (61 per cent.). The solubility of the double salts is such that one may easily obtain with Benzoate and Cinnamate of Sodium solutions containing per cubic centimetre 20 centigrammes of Caffeine, and with Salicylate of Soda, 30 centigrammes.

The principal use of Caffeine and one of the highest importance is in cardiac failure. While its primary effects are to lash the heart into violent contractions, until it closes tetanically in systole, its secondary action, if the animal recovers, is a rapid and fatal failure of the heart's action. These effects are fully described in my article on "Diseases of the Heart" in Arndt's System of Medicine.

The earlier investigators of Caffeine who observed its effects in toxic doses wrongly decided that it was a cardiac depressant. The same mistake was made in case of Digitalis. Recent investigations, both in health and disease, have established the fact that Caffeine, in moderate doses, a few grains daily, diminishes the pulsations of the heart, augments the vascular tension and the amplitude of the contractions, removes venous stasis, acts on the kidneys (even when they are badly damaged), and greatly increases the quantity of urine. At first small doses were given, a fraction of a grain, carefully, and doubtful of the safety of larger doses. But lately, Dr. Dujardin Beaumetz, Lupenes and Huchard have boldly given massive doses (5 to 30 grs. daily) and with marvelous curative results. It may be said that these doses are not Homœopathic. Perhaps they are not. I think they are according to the law of primary and secondary action. But granted they are not, the cases in which Caffeine is most useful, organic valvular disease and dilatation, no remedy can cure, but we can afford our patients great relief and comfort, and win their gratitude. In such cases it is not a question of homœopathy, but of humanity. We have but one remedy which acts in minute doses as Caffeine does in large, namely, Veratrum album.

Dr. Dujardin Beaumetz says (Clinical Lectures): "You will see the veritable resurrections effected by this marvelous therapeutic agent, and this in aged persons; therefore you ought to have these facts always in mind and remember them in the asystolic period—period of cardioplegia, as Gabler called it—when you have exhausted the remedial powers of all the cardiac tonics, you may still obtain signal effects from Caffeine."

I have verified this assertion in many desperate cases in my own practice and in consultation. I have seen patients whose hearts were near the point of irrecoverable paralysis, when general dropsy was fast wearing out the little life left, rapidly improve under the use of Caffeine, one to three grains every four hours. The terrible dyspnœa which accompanies such cases is magically relieved, and patients who have passed agonized nights sitting upright have been enabled to lie down with comfort. The methods of administration in such cases are various. Usually the coated pill is most convenient, but when the stomach is irritable, it had best be given hypodermically. If we desire to give less than one grain by the stomach, the first trit. is the best preparation, for trituration gives greater power than the crude drug, and $\frac{1}{10}$ gr. in trituration seems often equal to one grain in a pill.

In very urgent cases it has been recommended to give it largely diluted, so as to not offend the stomach. The following formula is best: Caffeine, 100 gr.; Benzoate of Soda, 100 gr.; water, ℥viiiij; each teaspoonful of this contains about 7 grains, which can be given three times a day. My favorite formula is Caffeine, gr. 60; Detannated fl. ext. wild cherry, ℥viij, each ℥j containing one grain; one or two teaspoonfuls every two or four hours.

For hypodermic use a solution containing 60 grs. of Caffeine to ℥j of water is best. Inject 10 drops every two hours till improvement is seen. It will require heat to dissolve it, and it must be injected at a temperature of 90° F.

When the patient is helped over the critical period, when the kidneys have acted sufficiently to run off the dropsical accumulations and the heart's action has become more regular, then some other cardiac tonic should be used, in order that the action of Caffeine may not "wear out," for it may be necessary to resort to it again. The following may be considered the latest views regarding the action of Caffeine: As to its medicinal influence over both heart and circulation there is no further doubt, nor can the complete absence of all cumulative action be questioned. Of paramount interest, of course, is the question: How does this drug compare therapeutically with Digitalis? Does it meet the same indications? Is it equally powerful, constant and prominent in its effects? It was with special reference to these important questions that Kurschmann, of Hamburg, investigated Caffeine (Centralblatt f. kl. Med., April 11th, 1885).

Caffeine cannot, according to Kurschmann's observations, be credited with the same amount of constancy of action on the circulation and the secretion of urine as Digitalis.

Its diuretic effects appear no sooner and remit far earlier than after

the use of Digitalis. While in Digitalis heightened renal pressure and slowing of pulse are coincident, the pulse does not slacken at all, or but very little, after Caffeine, even when increased diuresis is very marked. It seems probable that the two drugs act differently, on account of influencing the central nervous system differently; often Caffeine is efficient when Digitalis is powerless, and vice versa. No cumulative action, as intimated above, and no traceable permanent injury to the system can be made out in Caffeine, though occasional vomiting, nausea and headaches have been noted, forbidding its employment with certain individuals.

Kurschmann's general conclusions may be summarized as follows:

1. Caffeine and its double salts are usually borne well, even in large doses (up to 30 gr. pro die).

2. Its diuretic effects depend upon an increase of the arterial pressure. Though cardiac action grows often more regular, an appreciable slowing of the pulse is but rarely observable.

3. Caffeine cannot justly be called a heart-regulator in the sense of Digitalis (as taught by Reigel), as the absence of any coincidence between rise of renal (*i. e.*, aortic) pressure and slowing of the pulse.

Leblond thus sums up the views of physiologists respecting the action of Caffeine on the heart and circulation:

Londe, Nysten, Murray, A. Richard, etc., affirm that Coffee excites the action of the heart. According to Prompt, it accelerates the pulse.

According to Trousseau, infusion of Coffee increases the beatings of the heart. Rognetta says that the pulse is not quickened under the influence of Coffee, or, if it be quickened, this is due simply to the fact of taking a hot drink.

The pulse, he says, becomes slower, fuller and softer, indicating a depressant effect on the circulatory vessels. He adds, moreover, that Coffee has an elective action on the vessels of the brain, which it tends to deplete.

The tetanic state provoked by Caffeine, says Albert, does not limit itself to the external parts, to the peripheral muscles, but invades the heart as well; for as soon as the contractions manifest themselves in the members, the heart is spasmodically affected, labors and becomes sensibly smaller. It is in this way that Caffeine differs from the powerfully toxic narcotics: With whatever violence and rapidity (for example) nicotine may act on the heart of an animal, this organ preserves the regularity of its movements an hour and even more after the appearance of the paralysis or spasmodic contractions of the members, which

is not the case with Caffeine, whose action, as before stated, when given in toxic doses, is unique.

Penilleau and Dettel call Coffee an accelerator of the heart.

Caron, who, in an experiment on himself, took 7½ grains of Caffeine in one dose after breakfast, experienced at the end of two hours: First a general prostration of the forces, a vague headache, with trembling of the limbs, which staggered and could hardly support the body. Later still, a strange sense of nausea, a fulness of the stomach, continual somnolence, with prolonged want of appetite; and he remained until 11 o'clock at night without desire for food. His pulse gradually fell from 80 to 56 beats per minute.

Meplain, after having ingested 50 centigrammes of Caffeine, also found his pulse to fall from 72 to 51 beats.

According to Jourand, the action of Caffeine on the heart is one of slowing. Sabartherz, on the other hand, has recently noted that the infusion of Coffee produces an acceleration of the cardiac contractions, whether taken cold or hot, on an empty stomach, or after a full meal.

"It is necessary to bear in mind," says M. Leven, "that in toxic doses Caffeine always begins by augmenting the number of heart-beats; it is not till the second phase of its action that it slows them."

Voit, Stuhlman and Falk have arrived at the same conclusions.

According to Binz, Caffeine in moderate doses increases the action of the heart by directly stimulating this organ and exciting the arterial contractility. The blood-pressure and the frequency of the pulse are augmented; the temperature also rises one degree or more, and more urea and $C O_2$ are eliminated than in the normal state.

All the symptoms are of relatively short duration, for a part of the Caffeine is eliminated by the urine almost immediately after its absorption.

Gentilhomme, in his researches, affirms that Caffeine is without action on the heart.

Hoppe, Schmiedeberg, Johannsen and others fail to notice the action of Caffeine on the heart and circulation.

Henneguy, on the other hand, has observed that Caffeine slows and and then enfeebles the movements of the heart, which is arrested in systole.

According to Foussagrives, Caffeine augments the arterial tension, and with it the frequency of the pulse diminishes. There are excitation of the vaso-motors and augmentations of contractility in the small vessels. The heart is stimulated in a peculiar manner by it, and its movements become more energetic. Bennet, in his experiments, has always observed contraction, then dilatation, of the capillaries, with blood-stasis.

The increase of vascular tension had been previously noted by Magendie, who, on injecting 8 grammes of infusion of Coffee into the jugular vein of a dog, saw the liquid rise in the hæmadynamometer from 30 to 70.

According to Aubert and Dehn, Caffeine in large doses is without action on the heart of the frog, while in the dog and cat there are always seen extreme frequency of the pulse and diminution of the blood-pressure, followed by augmentation of tension, with slowing of the pulsations.

Meplain, in his experiments on man, arrives at the conclusion that there is augmentation of arterial tension. Sphygmographic tracings obtained upon the right radial have shown him that under the influence of Coffee the line of ascent was less vertical and less high; the amplitude of the rebound was much more feeble; the summit of the pulsation was less acute, and even transformed, in some cases, into veritable "plateau."

Dr. Giraud, studying on himself the action of infusion of Coffee and Tea, has come to the following conclusions:

In therapeutic doses, Caffeine—

1. Diminishes the frequency of the pulse.

2. Augments the arterial tension as well as the energy of the heart-beats.

3. Coffee and Tea appear to act only by virtue of the Caffeine which they contain.

According to experiments on animals, in toxic doses:

1. It accelerates, then slows, the respiration and circulation, by nervous exhaustion.

2. It diminishes considerably the blood-pressure.

3. It paralyzes completely the vaso-motors.

According to Stewart, Caffeine produces first a stimulant action on the heart, and augments the arterial tension, but consecutively it determines enfeeblement of the cardiac muscular power and diminution of the blood-pressure. It acts probably on the cardiac ganglia, which it paralyzes. In animals poisoned by Caffeine the respiration ceases before arrest of the heart.

Leblond has made a great many experiments to ascertain the action of Caffeine on the circulation, and these are his conclusions:

In physiological doses:

1. Caffeine is an excitant of the nerves and muscular system.

2. It diminishes the frequency of the pulse by augmenting the energy of the cardiac contractions and the blood-pressure through vaso-motor constriction.

3. It lowers the peripheral temperature.

4. It in no way influences the formation and excretion of urea.

In toxic doses:

1. Caffeine increases the excito-motor power of the cord, paralyzes the peripheral sensory nerves and acts on the vagus, whose excitability it diminishes.

2. It lowers the blood-pressure by paralysis of the vaso-motors.

3. The heart in cold-blooded animals slows more and more, and is arrested in systole; in warm-blooded animals it is quickened at the termination of the toxic action, and is arrested in diastole.

4. It produces a tetanic action on the muscles.

5. It causes a rapid fall of the temperature.

6. It augments denutrition.

Writing of the diuretic effects of Caffeine, Dujardin Beaumetz says:

"If Convallaria and Convallamarin are uncertain diuretics, it is not so with Caffeine, which renders us important service, almost equal to that of Digitalis, in affections of the heart. It is above all in the last stage of the malady, in the asystolic period, and when the other heart tonics have lost their effect, that Caffeine will render you the most signal service."

I shall not here take up your time with details of the physiological action of Caffeine on the circulation. When you take a general view of all which has been written concerning the effects of Coffee and Caffeine, you find that the theories which have been put forth on this subject may be arranged in three distinct groups. Some, as Gentill homme, of Rheims, others, as Trosseau, Rognetta, Penilleau, Delte- and Sabarthez, claim that it accelerates the beatings of the heart. Others, still, as Caron, Meplain and Foussagrives, believe that it slows the heart.

Whence come these differences of opinion? They are due to the fact that the toxic effects of the heart-tonics are the opposite of the therapeutic, and while Caffeine, in moderate doses, as the researches of Giraud and Leblond have shown, diminishes the pulsations by augmenting the vascular tension (*i. e.*, by acting as a cardiac tonic), in higher doses it increases the beatings of the heart and perturbs them. You easily understand, then, how, and according to the doses employed, exactly opposite results have been obtained.

It was in 1839 that an anonymous writer (M. S.), in the *Bulletin General de Therapeutique*, called attention to the diuretic action of Coffee, and its applications to the treatment of dropsy. Note, however, that in 1825 a Dutch physician had preceded this writer in extolling Coffee as a remedy in serous effusions.

In 1846, Honore, physician to the Hotel Dieu, signalized the favorable effects which he had obtained from the infusion of Coffee in albuminuria and dropsy.

But it was in 1863 that the first important work appeared on the therapeutic action of Caffeine in diseases of the heart. This was the production of Koschlakoff, an assistant of Botkin, of St. Petersburg. In 1866 Jaccoud introduced Caffeine into France as a remedy for diseases of the heart, and in 1877 Gubler spoke of it as the ideal diuretic.

Nevertheless, despite a very important practical treatise of Brackenbridge pointing out the necessity of large doses, Caffeine was administered thus far in but feeble doses, scarcely 50 centigrammes a day. The trials simultaneously made at Lyons by Lepine, and in Paris by Huchard, showed that these doses were insufficient, and that one should not hesitate to give two grammes (ʒss) a day of this medicament, in order to obtain its desired effects.

This is the rule which you ought to follow, and when you prescribe Caffeine you will do well to make use of one of the most stable preparations of this alkaloid, which consists of its combination with Benzoate of Soda, according to Tanret's formula:

Take of Caffeine, 7 grammes (gr. cv).
Benzoate of Soda, 7 grammes (gr. cv).
Water, 250 grammes (fʒviij and ʒijss). M.

Dose, a tablespoonful three times a day, each dose containing 50 centigrammes (7½ grs.) of Caffeine.

I discard as untrustworthy the preparations of Caffeine in pill form or in capsules. The capsules, in fact, often determine severe pains in the stomach, and sometimes vomiting. When you cannot administer Caffeine by mouth, you may make use of the hypodermic method, in which event the following solution will be found convenient:

℞. Benzoate of Sodium, 3 grammes (gr. xiv).
Caffeine, 2 grammes (ʒss).
Distilled water, 6 grammes (fʒjss). M.

Each cubic centimetre (syringeful) contains 25 centigrammes of Caffeine (about 5 grains.) Whenever, then, you have a patient in the last stages of heart disease, where everything has been tried and everything has failed, you may resort with confidence to Caffeine, and administer it in the dose of 20 to 30 grains a day, and you will often obtain effects truly marvelous.

The necessity under which we find ourselves of giving pretty large doses of Caffeine has caused Coffee and its infusion to occupy but a secondary place in cardiac therapeutics, and hence Coffee comes in

only as an adjuvant medicine, under the form of ptisan. By this roasted Coffee is meant. Certain authorities have vaunted the properties of *green* Coffee, not only as a remedy for gout and its manifestations, but also for hypertrophy of the heart.

Pelletan, who was much in the habit of prescribing this medicine, gave these directions: "Take twenty of the berries, bruise and pour on them a cupful of boiling water; this is to be rejected; then pour over them another cupful, in which they are to be allowed to macerate, and the whole is to be drunk by the patient."

I desire it to be understood that in the above I refer only to the use of Caffeine in physiological doses. I have not mentioned the strictly homœopathic uses of Coffea based on its primary effects—as recorded by Hahnemann—namely, in cardiac irritability, from nervous or emotional causes, for I have already treated of its value in such cases in the body of this volume.

I also desire to assert positively that the action of Theine, when obtained from tea, is very different from Caffeine, as much so as the physiological effects of Tea and Coffee. The two alkaloids should not be substituted for each other. I believe in cases where Caffeine has disappointed us in cardiac failure, it has been because Theine was used. It is well known that chemists use damaged Tea for the purpose of manufacturing the substance they call Caffeine.

As Prof. Mays has recently shown, such substitution is unjustifiable.

NOTE.—*Merc.* has announced a new preparation of Caffeine, the boro-citrate, which he says is soluble in water. This would seem a very desirable form in which to use it, internally or hypodermatically.

ON CONVALLARIA MAJALIS

(Lily of the Valley).

Habitat.—This charming little flower is a native of Europe and of the United States. It is found growing wild upon the highest mountains of Virginia and North Carolina. It is cultivated in gardens and conservatories in all countries where the people possess any claims to civilization and refinement. It has always been associated with sentiment and romance, and now bids fair to occupy a prominent place as an agent to alleviate the ills of the human organism. The flowers are noted for their purity and delicacy and for their delightfully fragrant odor, somewhat similar to orange flowers, although they have a bitter and acrid taste.

History.—I think it a little singular that there is no mention of the

lily of the valley in any of the botanic or eclectic medical works, or in the domestic practice of the common people in America, but Dr. Ralph D'Ary, Romeo, Mich., says:

"The Russian country folks, like the Indians of this country, are a very primitive people, and being almost beyond the reach of civilization and the medical advantages it offers, they have learned to help themselves in case of emergency. But whilst everybody is more or less of a herbalist or nurse, each village has its *znaharka* or wise-woman, who occupies about the same position as the Indian medicine-man.

"While on a summer tour through Russia—my native country—some year ago, I took special pains to obtain information concerning their methods and means of treating disease. As may be expected, it was difficult to gain the confidence and good will of the jealous and suspicious women, but whenever successful in that respect—with the aid of alcohol and flaming dress-goods—a very curious insight into popular medicine and pharmacy was afforded me. The revelations in the majority of the cases consisted of unmitigated trash, but here and there I obtained ideas, hints and positive knowledge, which were well worth retaining. Among the latter I class what I learned of the uses of that beautiful fragrant little wild flower, the lily of the valley (Convallaria majalis). I pass over the uses made of the root or leaves, since they are recorded in almost every dispensatory (the eclectic one of this country alone excepted, strange to say), and since their properties are not of the nature to make those parts of the plant a desirable remedy. The fragrant flower, however, deserves the closest study of the therapeutist. My attention was first called to it by witnessing the relief derived from it by an old man in the last stages of chronic dropsy. He used it as a diuretic and tonic for the heart, and it seemed to be so very efficient that I made his case an object of special observation, he willingly lending himself to my experiments. Since that time I have used a tincture in my practice, and have cautiously experimented with it, but, not being aware that the plant had ever been brought before the profession, and that physiological experiments had been made with it, I thought it premature to call attention to it until I should be able to give more than clinical observation to the medical press. Circumstances, however, have prevented me from making any systematic physiological experiments, and even at this day I should hesitate about submitting the present article to the medical world, if I had not found since that the ground had been fully prepared by the experiments of Waltz, Marme and others (see *New York Medical Journal*, November, 1867, and *Schmidt's Jahrbuch*, 1867, vol. 166), and especially those of Drs. Bogoyavlenski and Troitsky, of St. Peters-

burg, whose articles on the subject, in translation, I have furnished to the editors of the *Therapeutic Gazette*."

Pharmaceutical Preparations.—Parke, Davis & Co., of Detroit, prepare two fluid extracts, one from the root and the other from the flowers. In either case the strength of the preparation is a pound of the drug to a pint of the finished fluid extract, and the process used is maceration in a menstruum of fifty per cent. alcohol with subsequent expression by means of powerful hydraulic pressure.

The dose of the fluid extract of the root or of the flowers is from five to fifteen minims, to be gradually increased until the desired effect is produced. Probably all Homœopathic pharmacies have now prepared special tinctures of this plant, when it is in bloom, and only fresh flowers should be used.

Nearly two years ago, when the information relating to the virtues of the plant became known, I procured a quantity of the fresh root and prepared a tincture, using strong alcohol. I gave some of the root to Gross & Delbridge, of Chicago, who prepared from it a tincture. I have had ample opportunities to test this preparation, but I have never been able to get satisfactory remedial effects. I have tried Parke, Davis & Co.'s fluid extract of the *root* with no better success. This surprised me, as it is generally supposed that the roots of a plant must possess the properties of the plant.

I next tested the fluid extract of Parke, Davis & Co., which, they assert, is prepared from the *flowers*, and from this preparation I have always received good reports, and have seen the most prompt and decided remedial effects. The Homœopathic tincture can be ¼ the strength of this fluid extract. It should be made from the fresh flowers ℥iv to one pint of diluted alcohol.

Prof. Germain, of Paris, has found the aqueous extract of the plant to be the most active preparation. A concentrated solution dropped upon the heart of a frog speedily arrested its action in systole. The same prompt effect was observed in warm-blooded animals.

Employed in actual practice, the aqueous extract was found to act first as a strong diuretic, surpassing Digitalis in this respect. And it has this advantage over the latter, that it does not injuriously affect either the digestive or the cerebro-spinal system.

Botkin recommends two-third parts of a tincture made from the flower and stems and one-third part of the tincture of the root be mixed. Given in doses of 1 gramme (15 grains) of the aqueous extract to 1½ grammes (22 grains) *daily*, it produced very favorable results in cardiac diseases. Up to the present no precise statement of dose has been made with respect to *convallamarin*, which is evidently the active principle in the extract.

Convallarin does not appear to be of any value. The effects on the system of the two principles of the plant have been investigated by Dr. H. Marme, of Germany, with the following results: Convallarin, in doses of three or four grains, acts as a purgative, without observable inconvenience to the animals acted on; Convallamarin, even in small doses, produces active vomiting, whether given by the mouth or injected into the subcutaneous tissue, or directly into the veins. The latter principle acts especially on the heart, at first diminishing the number of its pulsations, and afterwards rendering them more frequent and causing death in a few minutes after the introduction of the poison. The heart appears to be paralyzed and cannot be excited after death. The principle acts on the heart through the vagi nerves, and resembles Digitalis in its mode of operation. From six to eight milligrammes caused death when injected into the cervical vein in rabbits, and 15 to 20 in dogs (*Schmidt's Jahrbuch*, 1867, v. 166).

The powder made from the flowers when dry has long been employed as a sternutatory, its effects being to excite a copious flow of tears and nasal mucus. The root and the flowers possess purgative properties, as does also an extract made from the former. Its mode of purgation has been compared to that of aloes and of scammony. The dried flowers have been used to prepare fomentations for the removal of ecchymoses and bruises, and, as well as the root, for the cure of worms, intermittent fever, and even epilepsy.

Dr. Alfavef, military surgeon in the Caucasus, writes: "The plants grow plentifully there in the mountains, and have a great reputation among the people as a remedy for intermittent fever. The doctor experimented systematically on thirty-eight typical cases of that fever, but with only indifferent success. The plant will, therefore, never rank among the remedies for this disease, but the experiments are very interesting from the fact that they throw a great deal of light on the mode of action, dose, etc., of this potent remedy, which we here produce, in short. According to popular precedent, the experiments were made with the flowers only, leaving it an open question whether the therapeutic effect of the root and stem is identical with that of the flower."

The alcoholic tincture was found to be the most convenient, as well as the most potent form of the drug. The tincture used was of the strength of four ounces of the flowers to the pint of dilute alcohol. In its mode of action it is very peculiar. When twenty or thirty-drop doses were given the pulse became slower and less compressible. No unpleasant effects were noticeable, although the doses were finally increased to half a fluid ounce each. The results of these experiments as concerning the pulse, in substance, are expressed by Dr. A. as follows: "In

small doses (five to ten grains of the powdered flowers, equal to 20 or 30 drops of the tincture), the remedy invigorates the pulse much more noticeably than in large doses (one drachm of the powder, or one-half fluid ounce of the tincture).

"Large doses seem to act simply as regulators of the pulse, no matter what was its preceding state. As to the diuretic effects of the remedy, I have observed that while small doses had a well-marked influence in that direction, this influence was not increased from larger doses. For instance, the following case: Simultaneously with tertian intermittent, a patient was suffering with acute hydræmia, general dropsy and stasis of blood in the lungs, the pulse being 120 and weak. He was ordered to take tincture convallaria, 20 drops, twice a day. No other remedy was used. In five days his condition was much improved; the pulse became stronger, the breathing freer, the quantity of urine had increased fourfold; but the intermittence showed no symptoms of abatement, the paroxysms being even more severe than before.

"I am, therefore, inclined to think that the Convallaria acts as a diuretic only as it stimulates the heart's action, and consequently increases lateral blood-pressure, being similar in this respect to Digitalis. But its great advantage over Digitalis is that it is quite harmless, even in overdoses.

"I have also tried the Convallaria (in small doses) in pneumonia, and once in a case of dropsy from fatty degeneration of the heart, and obtained a slowing of the pulse, and, in the latter case, an increase in the quantity of urine voided. I think it therefore likely that the Convallaria may with advantage be substituted for Digitalis, wherever the latter is indicated."

Ralph D'Ary, M.D., Romeo, Mich., writes: "I have used the remedy somewhat indiscriminately in every variety of heart disease coming under my hands, both functional and organic, with a view of testing its efficiency in the various forms of these affections, and nearly in every instance with most gratifying results. In fact I have not been able to determine any special indications (or contraindications) for its use—its effect seems so uniformly beneficial. It certainly had not the least direct restorative value, in my hands, in organic disease; not any more than Cactus grandiflorus, for which such claims have lately been set up by some enthusiastic practitioners, mostly of the Homœopathic persuasion. But although Convallaria is unable to alter the organic *status præsens*, it enables the patient to make the best of it, by compelling nature to put her best foot foremost. It is pre-eminently a regulator of nervous function, adapting the latter to existing conditions in such a manner as to compensate to the utmost possibility

for the existing organic lesion. The sympathetic nervous system seems especially to be under its control, though it is by no means devoid of a powerful influence on the cerebro-spinal system. This circumstance accounts for its almost universal adaptability, in varying doses, to every variety of heart disease. In small doses it is a stimulant to the heart, increasing the frequency of its beats; in larger doses it is a tonic and sedative, lessening the frequency, but increasing the energy and regularity of the contractions. In overdoses it is a swift destroyer of life, thoroughly paralyzing the heart. Over Digitalis it has a most important advantage in the absence of a cumulative effect, at least so far as personal observations allow me to judge. On the other hand, I have noticed that some patients seem, from idiosyncrasy, unable to endure it even in small doses. Wherever these unpleasant effects—manifested by dyspnœa, faintness, pain at the heart, etc.—become manifest, alcoholic liquors seem to me the promptest antidote. I would, therefore, strongly advise, in every new case, to begin with minimum doses and gradually increase until the desired effect is obtained, which generally takes place very promptly. It is an excellent nervine sedative tonic, especially where the patient suffers from the consequences of excessive reflex irritability or 'nervousness.' Thus I have found it useful in certain conditions of insomnia, hysteria, the restlessness of fevers, infantile nervous disorders caused by the irritation of dentition, etc. In tic-douloreux and neuralgia in general it has sometimes acted with great promptness. It is not a narcotic or anodyne simply, and therefore does not merely lull the pain by stupefying the patient's sensibility, but seems to act as a direct nerve tonic and sedative, restoring the equilibrium of nervous function. You will see, therefore, that it opens up a wide field for further careful investigation. In using it the practitioner should always bear in mind that in this connection the old adage may well be reversed, and should be remembered as *magis remedium, magis venenum.* But although it requires care in its employment, I believe the Convallaria to be a safer remedy than Digitalis, in its cardiac sphere, especially in desperate cases where large doses are imperative. What practitioner of any experience has not found himself once in a while in a responsible position where he had to choose between the almost certain death of his patient and another, and yet another, heroic dose of Digitalis, and yet had no means of ascertaining whether the preceding doses had finally expended their effect, or were only waiting the re-enforcement of another dose in order, with combined power, to extinguish the last remnant of cardiac life? How often is the last dose of the potent but treacherous remedy but the messenger of death! Herein lies the epecial value of Convallaria—once its effect

is expended apparently, it is so in reality, and another dose may be safely administered. Such is my experience, but as the point is one of so much importance, more than one or two men's observations should be recorded before it should be accepted as a fully-determined fact."

The following is translated from the Russian by R. D'Ary, M.D. (*Therapeutic Gazette*, October, 1881, p. 374): In May, 1880, Prof. S. P. Botkin requested me to repeat the investigations of Marme, Waltz, Brandt and others concerning the physiological effects of the above drug, in order to replenish the gaps left by them in the subject. Besides making experimental investigations, I was especially to try the remedy clinically (in cases of patients suffering from insufficient compensation), in order to determine the clinical indications for its use and the best mode of administration. Since that time to the present day (December) I have continued my physiological experiments in Prof. Botkin's laboratory, and am trying the remedy clinically in St. George's Hospital. The following are the results so far of my labors:

A. *Experiments on Frogs.*—Upon introduction of the infusion, the tincture or extract of the flowers of Convallaria majalis, into the lymphatic system of the frog, the following results are noticeable:

1. Retardation of the cardiac contractions, with an increase in their energy.

2. Irregularity in the diastole of the ventricle, some of its divisions remaining partially systolic.

3. Complete arrest of the heart-beat, with tetanic contraction of the ventricle, and distended throbbing auricle and venous sac.

4. The heart, after assuming this characteristic condition, does not change in response to electrical, mechanical or chemical irritation, nor upon application of Stannius' ligatures, nor upon division and irritation of the vagi, nor in consequence of destruction of the nerve-centres.

5. During the first and second stages of the intoxication the usual effects are obtained by electrical stimulation of the vagi.

6. If the vagi are divided previously to the introduction of the Convallaria, or if atropine is first introduced, the effects of the Convallaria are still the same.

7. If the nerve-centres are destroyed, a larger dose of Convallaria is required to produce the above results.

8. In all these experiments there were no abnormal deviations in the other organs of the muscular or nervous systems.

B. *Experiments on Warm-blooded Animals.*—The same preparations of Convallaria were used, with the following results:

1. A sudden retardation of the cardiac contractions, with increase of blood-pressure.

2. After the period of retardation there follows a strongly pronounced acceleration of the contractions, with still greater increase of blood-pressure.

3. Arrest of the heart-beat, with diminution of blood-pressure.

4. When the vagi are previously divided, the precursory retardation does not take place.

5. If during the period of acceleration of the contractions the peripheral ends of the vagi are irritated, the usual effect on the heart is not observable, but the following strange circumstance takes place: Those variations of pressure which are caused by the breathing movements of the animal, forming a wavy line on the indicator, very suddenly disappear, and remain in abeyance during all the time that the electrode is kept in contact with the nerve. (I am at present engaged in a closer investigation of the circumstance.)

6. In the left and right ventricles there is always found an extravastation of blood under the endocardium.

Dr. E. P. Hurd, of Newburyport, Mass., in the *Medical Record* of Feb. 17, 1883, states:

"From experiments on animals it is proved that Convallaria is a powerful toxic agent not inferior to Digitalis in its power to cause speedy death. Therefore, in its clinical application to human patients, it is well to be a little careful about the dose prescribed."

7. This effect is equally manifest, whether there be valvular deficiency or a narrowing of the cardiac openings.

8. The remedy does not seem to possess any cumulative properties.

9. The diuresis induced by the remedy continues long after the cessation of its administration.

One of the cases of heart disease which I treated with Convallaria majalis was complicated with chronic nephritis, but nevertheless the diuretic effect of the remedy was strongly manifested, though not quite in the same degree as in patients with healthy kidneys.

Troitzki and Bogoyavlenski, of Russia, say: "This common plant is a veritable substitute for Digitalis. It was formerly much employed, especially in Germany, and Matthiole has enumerated, at length, its properties, which at this time were attributed to the flowers of the plant. If we are to credit his statements, there are few diseases which were not happily modified by its use. Among their number he mentions palpitation of the heart, which it is claimed can be relieved by Convallaria majalis. This remedy, however, had entirely fallen into oblivion when the authors of this pamphlet endeavored to bring it forth anew, basing their claims on the results furnished by experimental physiology.

"Injected into the veins of warm-blooded animals, the infusion of the lily of the valley produces a diminution of the number of the heart's contractions, with elevation of arterial pressure. A little later the contractions become more frequent, and the pressure is further elevated; then the contractions cease and the pressure falls. In such cases, also, the section and excitation of the peripheric end of the pneumogastric produce no change. Besides these results obtained on animals, Bogoyavlenski treated with the lily of the valley six patients suffering with valvular non-compensated lesions. He administered an infusion of 3.06 grammes to 7.02 grammes of the plant in 120 grammes of water. Under its influence the quantity of urine increased *pari passu* with the disappearance of the œdema. The heart contractions became clearer, slower and more regular; the stasis in the small and large circulation began soon to disappear. The diuresis kept on even after stopping the use of the remedy.

"*Nephritis* in one of the patients suffered no change, the improvement in the general symptoms being merely less marked. Troitzki has noticed the happy effects of this remedy, especially in such cases where the asystole is caused by a nervous state which stops or hinders the compensation. He has used a less concentrated infusion of from 3.06 grammes to 7.02 grammes in 180 grammes of water, and has given of this infusion three or four spoonfuls per day in nervous palpitation of the heart. The effects obtained have always been very marked and singular. They have persisted for nine days after suspension of the administration of the remedy. The general excitation, the dyspnœa and the intensity of the palpitations disappeared completely. According to the same author, the Convallaria did not, like the Digitalis, give as favorable results in aortic as in mitral insufficiency, but it is much superior to Digitalis in nervous palpitation. Such is the resurrection of an old remedy, which had only been employed in sternutatory powders."

Dr. Troitzki also says: "The use of infusion of Convallaria majalis by persons suffering from heart disease, in any form, has generally produced good results in my hands, but is most striking in cases of insufficiency of the mitral valves. In affections of the aortic valves, and also in cases of mitral insufficiency complicated with stenosis, its efficiency is comparatively less. This, as is well known, is also characteristic of Digitalis. The cause of this unequal effect, on the diseases of the several parts of the heart, lies in the very nature of the physiological action of these remedies, which increase the arterial blood-pressure."

A great number of patients (suffering from mitral insufficiency,

either with or without stenosis) have consulted me either during the period of complete compensation, or after its cessation, when symptoms dangerous to life set in. During the period of compensation the patients consulted me because they were unable to take even the least bodily exertion without troublesome palpitation and dyspnœa, which would compel them at once to desist, and necessitate a more or less prolonged period of rest. This class of patients, who, moreover, are irritable in temper, through the effects of their affliction, generally beg of the physician to prescribe something that would lessen their irritability, and *eo ipso* prevent the occurrence of those torturing attacks of dyspnœa. Valvular disease in all, and which is so frequently the sequence of acute articular rheumatic cases, without exception, is productive of great irritability and peevishness. Even when it affects persons with fully developed moral character, this disease will so much change it as to render the sufferer almost unrecognizable as the person to his nearest friends, sometimes leaving him of his former temperament and disposition only a vague general habitus. To these patients I have been in the habit of prescribing an infusion of the flowers of Convallaria majalis (gr. x–f℥vj) in doses of one tablespoonful twice a day, and in two or three days it so far soothes their organism that it enables them to discontinue their enforced and irksome idleness, or even to undertake considerable exercise without producing palpitation and dyspnœa. The effect of the medicine, without repetition of the dose, continues from five to nine days, after which, if necessary, it may be taken again, and the same result will follow. Especial attention is invited to this sedative effect of the remedy, because the patients during the period of full compensation and apparent health apply to the physician with the special object of obtaining relief from their excessive irritability, and are not contented with the advice that in such cases is generally given them. We must give them something to lessen the reflex functions of the nervous system, and this is accomplished by the infusion of Convallaria majalis. The patient should be instructed to take the medicine only during the continuation of the highest degree of irritability, and discontinue it as soon as his condition becomes at all tolerable, for it is not known to me, as yet, whether the flowers of Convallaria majalis do not, like Digitalis, possess a cumulative action. The infusion of Digitalis, although given in stronger doses (gr. xx–f℥vj) was much less effective than the infusion Convallaria majalis, made of gr. vij–x to water f℥vj.

The influence of the latter, if taken during a paroxysm of palpitation and dyspnœa, is felt at once.

When compensation is no longer able to correct the consequences of

valvular disease, the remedy still acts satisfactorily, and it has great advantages over Digitalis, as the latter, in order to remove symptoms immediately dangerous, has to be used in such large doses that not many physicians, remembering the dangers from the remedy itself, dare repeat it. Instead, therefore, of giving heroic doses of Digitalis, I have repeatedly prescribed infus. flor. Convallariæ (gr. x–xij : ℥vj), ¾ tablespoonfuls, in a day, and with excellent results, the severe dyspnœa, œdema of the feet, and râles in the lower lobes of the lungs disappearing, so that in seven or eight days, after having taken the six ounces of infusion, the patient would feel tolerably well. In cases of severe dropsy through arrest of compensation I have not yet tested the remedy; consequently I cannot say anything about its diuretic effects, although I expect it will be found very valuable.

The following clinical indications for the use of Convallaria majalis are from Dr. E. C. Trudeau, of Saranac Lake, N. Y., who writes to the *Medical Record* his experience with the use of this remedy for a year past and expresses his belief that it is most successful in all cases where it is imperative to restore the balance of the *right* side of the heart, while it is much less active when increased energy on the part of the ventricle is called for. Its striking power in controlling dyspnœa in cases of emphysema, fibrous and chronic phthisis (cases in which Digitalis frequently fails), in relieving the orthopnœa of mitral disease, increasing at the same time the flow of urine, and its failure to mitigate the symptoms of aortic mischief or to increase the flow of urine in such cases, are clinical facts which tend to confirm this suggestion. It is in relieving dyspnœa that Convallaria attains its most brilliant results, while it has only an uncertain and trifling power over œdema and dropsy, and it succeeds often in precisely the cases in which Digitalis fails. Another indication for its use, not hitherto dwelt upon, is in controlling the symptoms of purely functional heart disorder.

Paroxysmal palpitation and dyspnœa, due to nervous causes, rapid and irregular heart action dependent upon debility, are symptoms almost always benefited by it, and which often entirely disappear during its exhibition.

[I can agree perfectly with Dr. Trudeau, who has more clearly defined the sphere of curation of this remedy than any other writer. In his original paper Dr. Trudeau says he prescribes it in doses from gtt. x to ℥j of the fluid extract. In the same class of cases I have succeeded just as well with five to ten drops of the tincture, made from the fluid extract of the flowers. My dose only represents one-fifth that of Dr. Trudeau's. In inflammatory cases I use only one one-hundredth as much as he, and yet get prompt results.—*Hale.*]

In the *Medical Record* for February 7th and 15th, 1883, are reported twenty cases of cardiac, renal and pulmonary diseases, treated in hospital with Convallaria. But the report is unsatisfactory, for a majority of the cases were almost "in extremis;" others incurable; but even in these cases a few received marked benefit; and a study of the report is not without value.

At Dr. Botkin's Military Hospital, St. Petersburg, a woman applied for medical aid. She was 30 years old, of medium size, thin and anæmic. She complained of constant dyspnœa, palpitation and pain about the heart, radiating into the left arm, and down, along its internal aspect, into the fingers. Exacerbations of these symptoms took place several times a day, and sometimes in the night. She was unable to work, and was losing flesh; could sleep but little, and only in a sitting posture; had suffered for ten months, although she had been constantly treated by physicians. The cause of her illness was unknown to her. Her thorax was normal, breathing superficial, 48. Radial pulse small, 116, whilst the carotids and aorta pulsated violently. Her hands trembled very much. Immediately below the left clavicle there is a very noticeable dulness, which extends along the left parasternal line, and which over the third rib merges completely into the absolute dulness of the cardiac region, the latter extending toward the right as far as the median line. The heart impulse is vigorous and in the normal situation. The second heart-sound is more pronounced. The respiratory murmur along the parasternal line is weak and short, but improves after deep breathing. On palpation of the abdomen the right kidney was discovered to be painful and movable.

He pronounced the case one of neurosis of the cardiac apparatus, taking the form of angina pectoris, and which had already caused a change in the dimensions of the heart. Thus, its diameter was increased so as to reach the median line, and increase in the size of the left auricle was indicated by the dulness along the left parasternal line. In consequence of the insufficient evacuation of these parts of the heart, there were abnormal blood-supply to the lungs and dyspnœa. The cardiac neurosis in this case is probably due to reflex influence from the abnormal situation of the right kidney, which not only was irritated itself, but kept up an irritation of the adjacent organs.

The patient was ordered to apply clay poultices to the cardiac region, to take two or three warm baths a week, and to wear a special belt to retain the kidney in its proper position. Internally she received:

℞—Camp. monobrom, ʒj.
Chloral hydrat. ʒss.
Pulv. acaciæ.
Sacch. albi, āā ʒj.
F. Pill. No. 60. Two pills three times a day.

On the 10th there was no improvement. Examinations showed only slight sensitiveness of one kidney. The patient was now given tinct. Convallariæ majalis, 10 drops, four times a day. The baths and belt were continued.

On the 17th the patient reported that she obtained relief from the very first dose of the medicine, and now feels well. She can sleep in the recumbent position; has no more palpitation or dyspnœa. Pulse 80–90; respiration 22. The parasternal dulness is less marked. Cardiac dulness now extends only as far as the left parasternal line. Pulsation of the aorta is still too violent, but less than before. Heart-tones clear, with slight accentuation of the second sound. When breathing deeply there is a vesicular murmur, though rather weak, along the parasternal line, where the dulness was. The right kidney is less sensitive. The whole success in this case of rather complicated cardiac neurosis is evidently due to the tincture of Convallaria, since the remedies previously employed had no effect.

We believe the relation of this case to have some practical value, since cardiac neuroses are frequently met with in practice, and we have hitherto had no certain and reliable remedy for their treatment.

Our usual cardiac remedies—Digitalis and Adonis vernalis—says Professor Botkin, in the vast majority of cases of cardiac neurosis, have no effect whatever, whilst Convallaria generally acts like a specific. But in these cases it should be used in form of an alcoholic tincture, not in infusion.

It is probably more largely used in Russia than in any other country. I am not aware that it has been used to any extent in England. In France, however, we have some excellent reports from the "Clinique" of Prof. See. In this country it is being largely used by both schools of practice.

HOMŒOPATHIC PROVINGS OF CONVALLARIA.

We, who believe that the law *Similia Similibus Curantur* is the chief or only scientific law of cure, know that a proving, or series of provings, of a drug on the healthy, will always confirm the cures or remedial effects of a drug which has been used successfully in an empirical manner.

The use of Convallaria has not been solely empirical. Its only purely

empirical uses have been by the aboriginal inhabitants of Russia, who gave it in a crude manner in hysteria, epilepsy, dropsy, etc. They had no idea of its specific relation to any particular organ. But such crude uses served as a hint to scientific physicians, and they have ascertained from experiments on animals that it caused pathological conditions in the healthy heart. Experiments on healthy men they did not make. But they reasoned that if Convallaria caused the healthy heart of an animal to beat slower and stronger, and finally cease to beat from a firm contraction in systole, it would act as a tonic and regulator to a disordered heart, rendered weak and flaccid, and with irregular, feeble action. Its administration in such cases proved the deduction to be true. But they did not possess a knowledge of the special symptoms produced on men and women by the drug. It remained for us to supply this want by our systematic provings. Dr. Irving J. Lane gives us his thesis in the May number of the *North American Journal of Homœopathy*, which contains three provings of Convallaria. Two of these are on men, and one on a woman.

Dr. Lane's proving showed that the drug possesses a decided affinity for the heart, and, although the cardiac symptoms are not as numerous and well marked as we could wish, they afford good indications (together with the pathological symptoms which we possess) for the use of the drug.

The female prover gives us an unexpected number of symptoms due to its action on the uterus and ovaries. They remind us of Lilium tigrinum, and show it to be an analogue of Gelsemium, Platinum Sepia, Caulophyllum, Xanthoxylum and Viburnum. I have thought best to append these provings to this paper, as it will meet the eyes of a larger number of our school than if allowed to remain in the pages of the *N. A. Journal.*

PATHOGENESIS AND THERAPEUTICS OF CONVALLARIA.

Mind.—Depression; mind wanders from subject when reading; feels irritable when asked a question. (*Lane.*)

Great irritability of temper (in heart diseases).

Head.—Vertigo in the morning, with faint feeling; dull headache, commencing in vertex and extending to temporal region; dull feeling in the head; dull heavy ache over the eyes; dull aching in right eye and temple, with pain from eye extending over top of head and down right side of neck about every fifteen minutes. (*Lane.*)

Eyes.—On going from a dark room into the light, sees gray-colored spots about three inches square in different parts of the room; all letters

look alike when reading; sees small words before the beginning of a sentence; the letter P is substituted for other letters; upper eyelids feel heavy when looking up; dull aching pain in right eye.

Ears.—Pulsating pain in left ear, with heat; pulsating pain in right middle ear; when swallowing, tympanum of right ear seems to bulge out, relieved by pressing on temporal artery in front of ear.

Face.—Smoked color, after exercise; looks pinched.

Throat.—Dry, suffocating sensation, as if she could not get her breath.

Stomach.—Eructations tasting of fat; some time after eating, eructations tasting of food; nausea and faint feeling in the morning, followed by vomiting a small quantity of clear substance tasting like phlegm; nausea after eating and exercise, with vomiting and mucus, tasting like slime from oysters; increased appetite.

Nausea and vomiting, after eating, with mucus, tasting like slime from oysters; increased appetite; symptoms relieved by eating, but returning again soon. (*Lane.*)

N usea in the morning, exactly like the morning sickness of pregnancy.

Abdomen.—Dull colic-like pain in left iliac region, relieved by micturition; colic-like pains in umbilical region, come suddenly and pass off slowly; uneasy sensation, causing desire for stool; colic in lower part of abdomen; sore, aching pain in hypogastric region; sore, aching pain in lower part of abdomen, causing her to hold her breath; feels sleepy during pains; coughing causes sore pain in hypogastric region; colic-like pains commencing on right side, and going to left; sensation as if she were filling up, causing dyspnœa; abdomen seems larger than it really is, although somewhat distended when sitting; dull, aching, paroxysmal pain, causing desire for stool, relieved by stool; laughing or coughing causes a sore feeling in lower part of abdomen. (*Lane.*)

Stool and Anus.—Sore, burning pain at anus during stool, uneasy sensation in abdomen, causing desire for stool; dull, aching pain in hypogastric region, with feeling of fulness and desire for stool, relieved by stool; slight diarrhœa; diarrhœa between 2 and 6 P.M., offensive odor, like decayed meat, light brown color; slight tenesmus; dull grumbling pain in bowels as if they would move; sensation of an abundance of flatulence in abdomen that would pass at any time, but can retain it; rectum full of gas, not relieved by passing flatus; uneasy feeling in hypogastric region, with colic; would last about fifteen minutes, then there would be an urgent call for stool, which would relieve. (*Lane.*)

Is a powerful purgative like Aloes (in very large doses).

Urinary Organs.—Some sugar and phosphates; frequent desire to urinate, passing only a small quantity at a time; urine seems scalding hot, but leaves no smarting. (*Lane.*)

Great increase of urine, which is clear and watery.

Female Organs.—Labor-like pains in sacro-iliac synchondrosis, as in first stage of labor; bearing-down sensation worse on right side; sleepy between the pains; pains come quickly and pass off slowly; labor-like pains extending along inner side of right thigh; all the above pains aggravated by motion, sitting up straight or leaning back; relieved by bending forward. Pain commencing in anterior part of abdomen on right side, as in second stage of labor, but extending up higher; sensation as if a large cord extended from sacro-iliac synchondrosis to inguinal region, which was pulled down by the pelvic organs; worse on right side. Uterus seems descended and retroverted, the fundus of uterus pressing on the rectum, causing a very hard, aching pain in rectum and anus. This pain was described as continuous and unbearable; labor-like pains extending up sides of back, causing nausea and faintness, with hunger; pain relieved when lying on back, but then there was a sensation as if a fœtus at eight months were kicking in abdomen; aggravated by being on her feet; sensation in right breast as if milk were coming in breast, followed by sharp, stinging pains centering in the nipple; intense itching, commencing at orifice of vagina and gradually extending to meatus urethra, and all over the labia, with great hyperæmia, but no eruption; it was almost unbearable, causing a feeling as if she must weep; aggravated by the slightest motion of legs; relieved by applying cold water. Raising head from pillow in the morning, had a feeling like morning sickness; relieved by vomiting a small quantity of a clear substance, tasting like phlegm. Eructations during the labor-like pains.

Thorax.—Sharp pains in right or left nipple; sharp, radiating pains beneath the upper part of sternum. (*Lane.*)

Great pain in the heart.

Respiratory Organs.—Dyspnœa, caused by sensation as if she were filling up in the abdomen; desire to take a deep breath when sitting. (*Lane.*)

Great dyspnœa, with faintness, and palpitation of the heart.

Great dyspnœa upon making the slightest exertion (*without* cardiac disorder).

Heart and Pulse.—Heart's action very weak; pulse very weak and compressible; dicrotic pulse, heart-sounds feeble; anæmic murmur heard over jugular vein; pulse imperceptible with hand extended

above the head; sensation as if the heart had been palpitating; when exercising, heart would flutter for about a minute, then the face would get red, and then there was a sensation as if heart stopped beating, starting again very suddenly, causing a faint feeling; pulse full, compressible and intermittent. These symptoms under heart and pulse are very characteristic of the drug. (*Lane.*)

Primary Effects.—Heart's action slower, with increased force. Increase of blood-pressure in the arteries. Slow and forcible contractions of the heart until it stops in systole from tetanic contraction. In the left and right ventricles, extravastation of blood under the endocardium. The ventricles are found empty and closed.

[*The Secondary Symptoms*—Are well given by Dr. Lane in his provings. After the period of slow and powerful contractions the heart becomes exhausted, beats irregularly and feebly, and is irritable and paretic, until it is restored by the vital recuperative forces.]

Neck and Back.—Dull aching, or sore pain in lumbar region; aggravated by sitting up straight or leaning back; sharp or dull pain under lower angle of scapula, ameliorated by bending the shoulders back; sharp pains in region of kidney; at 2 P.M., dull, aching pain between lower angles of scapula, extending up and down the spine; pressive aching pain under lower angle of right scapula; constant gaping and yawning after the pain. (*Lane.*)

Upper Limbs.—Rheumatic pains in left elbow-joint, at night, on exposure to cold; ameliorated by motion; hand numb, and went to sleep upon holding it above the head; aching pains in wrists. (*Lane.*)

Lower Limbs.—Cramps in inner side of right thigh, relieved by pressing foot against something; aching pain in ankles; knees sore while walking; cramps in calf of right leg while sitting, relieved by standing; passed off quickly, returned after sitting down; when first bearing weight on her feet after lying down they were numb, then a sensation as if the soles of feet were full of needles (or asleep). (*Lane.*)

Skin.—Blotches like mosquito-bites, commencing on anterior part of thigh; great itching, not relieved by scratching; worse on exposure to the air; itching on anterior part of thigh, but no eruption. (*Lane.*)

Generalities.—Pains leave a sore feeling; feel sleepy between the pains; faint feeling from slight cause; hand went to sleep when extended above the head; sharp pains in nipples; sensation as if getting fat inside, filling her up; sleepy and all tired out, as from bodily exertion; sick feeling all over; great prostration; feeling as if just recovering from a long sickness. (*Lane.*)

Sleep.—Sleepy on going into a warm room from open air; sleepy while in warm room; awake about 2 A.M., very restless for some time,

then go to sleep again, and sleep until about 5 A.M., then awake again, and would be very restless until morning; restless after sleeping, between the pains.

Fever.—Burning, hot feeling over the body; after midnight, temperature decreased; perspiration over whole body; short paroxysms of hot, suffocating sensation, with perspiration over body.

Aggravations.—Sitting up straight or leaning back, laughing or coughing, every other day.

Amelioration.—In open air, by exercise, standing, lying down, leaning forward while sitting, eating.

A study of the therapeutic powers of Convallaria can now be made, based on its provings and clinical experience. I propose to take up the various disorders in which the remedy can be used, in the relative order of their importance.

I.—DISEASES OF THE HEART.

We can confidently assert that it is primarily homœopathic in many conditions of the heart marked by *excess of blood-pressure*, from some irritation of the cardiac accelerators, or of some organ in sympathy with the heart. Convallaria is the direct antagonist of Aconite, Veratrum viride and Veratrum album. The latter by their primary toxic action depress the motor-force power of the heart, until it dies in *systole*. The former, like Digitalis, Iberis, Adonis and Strychnia, primarily stimulate the power of the heart until it dies in *diastole*. But to prescribe Convallaria strictly in accordance with the law of *similia* it must, when prescribed for symptoms simulating its primary effects, be given in the attenuations above the 3d. Among these primary conditions I will name *endocarditis*. In this disease we have an inflammation of the lining membrane of the heart and its valves. At first there is increased force in the heart's contrations, due to the excitation of its ganglia by the inflammatory irritation. We cannot push *Aconite* or *Veratrum* too far, or we shall weaken the heart. We cannot yet give *Convallaria* or *Digitalis* in material doses, without injury. The following case will illustrate: A woman had rheumatic fever. In the second week the heart's action became hard and quick. Auscultation revealed roughness of the valves and some irregularity of action. The pulse was hard, but irregular. Convallaria 3d, 10 drops every hour, was given, and in twenty-four hours the heart was greatly improved, and in forty-eight hours its action was nearly normal. This was my first use of the remedy in endocarditis acuta, and I was delighted with the results.

Nervous palpitation from exciting causes located in the central nervous system or in some organ, such as the uterus, ovaries or stomach, or in some mental shock. In these cases the heart beats with abnormal force. Here the attenuations of Convallaria act excellently, and it is only rivaled by Coffea and Cactus.

In addition to its specific action on the heart, Convallaria is a *nerve stimulant*, acting somewhat similar to Valerian and Asafœtida, and I predict that it will attain a wide popularity in the neuroses of women and in neuralgias of a functional character. I have lately treated successfully two cases of extreme nervous erethism in women due to alcoholic indulgence, with the 2d of the fluid extract of the flowers. In a previous portion of this paper mention is made of its value in *hysteria, epileptiform convulsions*, etc., by the Russian peasantry, who use an infusion of the flowers.

Like *Digitalis* and its congeners, Convallaria exhausts the irritability of the heart, and its central nervous supply, and, as a consequence, its secondary effects are *cardiac paresis*. It is, therefore, indicated in all affections of the heart, from whatever cause, when the cardiac muscle or its ganglia are so diseased that the heart's action is *feeble, irregular* or *intermittent*. It is useful in the results of *endocarditis rheumatica*, in diseases of the *valves*, attended with deficient power and unattained compensation. In *stenosis* or *insufficiency*, when the ventricles fail in strength, or when thinning of the walls has obtained, then Convallaria in appreciable doses will not disappoint us. By *appreciable* doses I mean all quantities from one drop of the 1st dilution to 10 or 15 drops of the mother tincture, for, according to the law of dose which I have taught and practiced for a quarter of a century, *the nearer the secondary effects of a drug simulate the secondary effects of a disease, the larger should be the dose*, provided we do not cause with it *primary* drug-aggravations.

We cannot expect to remove, with this drug, actual structural diseases, but I claim that we can give great comfort to the patient, and prolong life indefinitely, if we use it with caution and discrimination.

In *dropsy* due to cardiac disease, the experiences of American physicians are at variance with the French and Russian. The latter claim that when the heart's tonicity is increased, the kidneys act freely, and the œdema disappears. In this country such effects are not generally observed, nor have I been as successful with it in such cases as with Digitalis. Dr. E. M. McAffee, of Clinton, Iowa, informs me that he has observed marked diuretic effects from it in a case of mitral insufficiency, with thinning of the left ventricle.

Among the diseases which Convallaria has benefited may be men-

tioned *aortic regurgitation* or *insufficiency*, sometimes called *Corrigan's disease*, from the fact that he was the first one to give a reliable description of the condition, and to point out the special diagnostic importance of the pulse in this affection.

The left venticle undergoes dilatation and hypertrophy in order to compensate for the insufficient valves, hence the systole is more forcible than normal, and the blood bounds into the arteries, giving a feeling of peculiar largeness and fulness to the pulse, which almost immediately collapses under the finger as, during the diastole, part of the blood reenters the left ventricle.

This collapsing of the pulse conveys the impression of a ball of blood passing under the finger, and, taken in connection with visible pulsation (as noted by Corrigan) in the arteries of the head and upper extremities, is almost pathognomonic of aortic regurgitation.

Dr. E. P. Hurd reports the case of a patient suffering from Corrigan's disease—partly compensated—who was incapacitated for any but very moderate exercise and had attacks of syncope, dyspnœa and angina. After taking Convallaria only three days he was entirely free from his usual faint and giddy turns, had no angina, and was able to do his work with increased comfort.

No remedy I have ever used has given me such gratifying results in *cardiac asthma*, or that peculiar *dyspnœa* which is such a distressing accompaniment of diseases of the heart. It will relieve this symptom, even when it does not seem to modify the other conditions upon which it depends. This leads me to consider its powers in

II.—DISEASES OF THE RESPIRATORY ORGANS.

In many cases of acute diseases of the heart, the lungs become congested from the powerful afflux of blood thrown by the overacting heart. This results in dyspnœa, cough and hæmorrhage. If Aconite or Veratrum viride fails to remove this condition, Convallaria, in minute doses, comes in and removes the distressing condition. But it is still more useful in the opposite conditions, when, owing to cardiac debility, there occurs a blood-stasis in the lungs, or they become anæmic. Here the *dyspnœa* becomes excruciating, and the patient seems on the verge of dissolution. Convallaria, in other hands, as well as in my own, has, in such cases, brought about the most brilliant results. Even in cases of *emphysema*, when there was no apparent cardiac debility, Convallaria has brought great relief.

We can come to no other conclusion than, aside from its stimulating power upon the heart, it is a powerful *respiratory stimulant*, equaling, if not exceeding, that of *Coca* or *Atropia*.

If Convallaria acts on the heart through the spinal centres, it may resemble Strychnia in its action on the respiratory muscles, and cause increased power, even to the point of tetanic contractions. Strychnia is considered a respiratory stimulant of great power. But the secondary effects of Convallaria, like those of Strychnia, would be to cause respiratory paralysis. Both are, therefore, homœopathic to that condition. The two following cases, reported by Dr. Fordyce Barker, of New York, to which I have added one of my own, illustrate its great remedial power over *dyspnœa*, even when the heart is normal:

Case I.—Five weeks ago he was called to see a gentleman who was in a very feeble condition, but the only evidence of disease which the doctor was able to detect was a general failure of nerve power and loss of appetite and strength. Any exercise caused shortness of breath, and at times he suffered from a sense of suffocation, with palpitation, and a feeling of terror. When an exacerbation came on, the patient was ashy white, very restless, anxious and alarmed, and there was coldness of the extremities. Careful examination, made not only by himself, but by several eminent physicians in cities through which the patient had been traveling, failed to discover either cardiac, pulmonary or renal disease. The patient had profound mental depression, on account of family affliction. It was noticeable, however, that during the period of his greatest distress there was no marked febleness of the pulse. Six drops of Convallaria were prescribed to be taken every three hours. On the evening of the same day, six or eight hours having elapsed, the patient expressed himself as feeling very much better, and on the following day as being in the most comfortable condition he had been in for two months.

Case II.—A widow had an attack of bronchitis, accompanied by a very violent and persistent cough. Nervous prostration was very great, attended by apprehension, inability to get her breath, palpitation, etc., *but there was no marked weakness of the cardiac impulse.* Convallaria was prescribed, and the benefit which followed was even more marked than that shown in the first case.

To these two cases I add one of my own out of several similar ones:

Case III.—Mrs. B. had rheumatism when a girl, which left her with a mitral insufficiency. During her first pregnancy she suffered severely from dyspnœa and œdema of the legs. This was controlled by quiet and Digitalis, aided by Cactus and Hyoscyamus. Her child is six years old, and she has had occasional attacks of cardiac trouble, owing to deficient compensation. The last attack was the severest she had known. The *dyspnœa* was excessive. She could not walk across the room, or turn quickly in bed, without want of breath. Going up-stairs

was nearly impossible. I had to forbid all exercise and keep her in bed. Her face was pinched and haggard; lips blue—cyanotic; pulse very feeble and irregular. Heart-sounds noisy, tumultuous, and showing all the characteristics of mitral insufficiency with thinning of the left ventricle. The urine was scanty and infrequent. I thought I would test the value of Convallaria, and prescribed 30 drops tincture of the flowers, in half a glass of water, a teaspoonful every two hours. The effect surpassed my expectations. She said she observed the good effects after the third dose, and at the end of twenty-four hours the heart's action had become regular, and the pulse regular and firmer. The urine had notably increased from ℥vii to ℥xx. On the third day I allowed her to sit up and walk around the room, which she could do without the previous dyspnœa. After a week the medicine was suspended. She was comfortable for a few days, when some unusual exertion brought the old symptoms back in a less degree. I gave her the tincture of the *root* in the same quantity as before, but she got no beneficial effects after forty-eight hours. A return to the tincture of the flowers brought prompt amelioration.

I mention this case on account of the prompt action the drug had on the *dyspnœa*. These cases prove that it removes this symptom in cases where the heart is to blame and where it is not.

My case also proves that the tincture of the root is not reliable as an agent to control dyspnœa or cardiac failure. I am aware that more favorable results have been got from it, but not in my hands.

Emphysema.—In this condition Convallaria is reported to have given relief. In one case which came under my care, its administration was attended with some amelioration, but not as promptly or satisfactorily as with *Naphthalin*. If with the emphysema we find a thinned and paretic heart, we may expect good results. If the heart is enlarged —concentric hypertrophy—Naphthalin will give the best results.

In the provings we find some symptoms which directly indicate Convallaria in dyspnœa, namely, "*Dyspnœa*, caused by a sensation as if she were filling up in the abdomen; desire to take a deep breath when sitting," and "dry suffocating sensation as if she could not get her breath." While these symptoms do not closely simulate dyspnœa from cardiac trouble, they *do* closely resemble *hysteric* dyspnœa.

The *head symptoms* point to cerebral anæmia, with neuralgic pains.

The *eye symptoms* to an anæmia of the bloodvessels of the eye; also some special symptoms of interest to the oculist.

The *gastric symptoms* remind us of Pulsatilla, and also of *Viburnum opulus*. Both have symptoms resembling the morning sickness of pregnancy. Both have the following symptoms: Gastric symptoms, relieved by eating, returning soon again.

The *gastro-enteric* symptoms simulate a condition common in gastro-enteric catarrh, and it may be found one of our best remedies in such states, especially if we find a condition very common in that affection, namely, sympathetic cardiac irritation.

The symptoms of the *urinary organs* are meagre in these provings, but the "dull, colic-like pain in the left iliac region, relieved by micturition," is suggestive of irritation of the *ureters*.

The *genital symptoms* show a decided affinity for the uterus. We may account for this on the theory of botanical affinity, for Convallaria belongs to the *Lily* family, among which are the *Lilium tigrinum*, the symptoms of which are closely imitated by those of Convallaria. A careful study of these symptoms will convince any one that if they are trustworthy and are verified, the Convallaria will prove to be an excellent remedy in many uterine disorders. It is quite probable that when all the *genus* Lilium are proved, we shall find they are all genito-urinary and cardiac remedies.

We now know that other members of the *Liliaceæ* are cardiac remedies. Squilla is a powerful stimulant of the heart; so is the genus *Allium*. The symptoms of Lilium tig. show it to be a cardiac irritant, indicated when the heart symptoms are connected with uterine or ovarian irritation.

My own experience with this remedy has been as large, if not larger, than most of our school, probably owing to the fact that many cases of cardiac disease come to me from the profession.

My comments on the scanty symptomology of the drug have been made with the hope that they may stimulate my colleagues to make more extensive provings, and to enlarge our therapeutic knowledge of Convallaria by a wider clinical experience.

DIGITALIS.

Below I have reprinted a paper I read over *twenty* years ago, and I reprint it because it was severely criticised at that time by several prominent members of our school. But time, instead of having disproved my views, has confirmed them in every respect. Nothing really new concerning this great remedy has been discovered since that time.

ON THE ACTION OF DIGITALIS.*

At the last meeting of this Association, I was appointed to discuss

* Read before the Illinois State Homœopathic Medical Society, 1867.

the "Action of Medicines." A subject, however, of such extensive scope cannot be properly discussed in the limits of a single paper.

I have, therefore, thought best to present, for your consideration, a single medicine, and discuss its method of pathogenetic and curative action.

The medicine I have selected is *Digitalis*, on account of the interest which has of late been felt in its action, as well as the importance which a knowledge of its action on the system may have in assisting to the recognition of the Homœpathic law of cure.

Ever since the discovery and use of this plant in medicine, it has been considered an agent extremely *depressing* in its effects, particularly as relates to its effects on the heart. This depressing action was believed to be its only effect, primary as well as secondary; and it was not until the announcement by Dr. Hanfield Jones, in 1859, that *Digitalis* had a "tonic" effect on the heart, that the medical profession would look upon it in any other light.

In the Homœopathic school, *Digitalis* has been considered indicated only when the heart action was *weak, irregular, slow* or *intermitting.* Hahnemann says, in a note to *Digitalis:* "It is the most ordinary and certain characteristic property of *Digitalis* to depress the pulse in its primary action. This depression is then permanently followed by a much smaller and more frequent pulse, which shows how great a mistake is committed by physicians of the Allopathic school, who imagine that they can permanently retard the pulse by *Digitalis.*"

It is not strange that Hahnemann should fall into the same error as all his cotemporaries, when we consider the universal belief in its depressing action, prevalent at that time. But there were some points about the action of *Digitalis* which evidently puzzled Hahnemann; for, in another note, he remarks that "A large dose of *China* will increase the anxiety caused by *Digitalis* to *deadly anguish.*"

How *China* could have this effect will be explained hereafter.

Before we enter into this discussion, there are certain propositions which should be laid down.

1. There are certain medicines known as having a "stimulating" or "irritating" power.

2. These medicines, given in small but material quantities, to healthy persons, have the effect to increase the force and frequency of action of the heart, or to cause increased action in any organ or tissue.

3. In larger quantities, or massive doses, this increased force becomes *tetanic,* in which all action and nutrition are, for the time, arrested.

4. Following distinctly after this acme (if death does not occur)

comes *paralysis*, or else debility, with slowness and feebleness, or quickness and feebleness of action, ending, if not arrested, in fatal exhaustion.

Familiar illustrations of this method of action may be found in *Nux vomica* and *China*, or *Strychnine* and *Quinine*, which, in small doses, excite and irritate; in massive doses, tetanize and destroy, and whose secondary action is to enfeeble almost every tissue in the organism.

Contrary to previous notions, *Digitalis* must be considered as analogous to *Strychnine*, *Nux vomica*, *Ignatia*, *China*, *Quinine* and *Iron*. To prove that *Digitalis* has an action analogous to these medicines, I quote from the following authorities:

Dr. H. Jones stated, in 1859, that he had become satisfied that *Digitalis* acted as a "powerful cardiac toner, or stimulator."

Winogradoff and Traube show, by exact experiment, that *Digitalis*, if *not given to excess*, does not diminish, but actually *increases*, the *pressure in the arteries*. The former states that *Digitalis* acts both on the regulating and motor nerves of the heart (the vagi and sympathetic cardiac nerves), and that the degree of pressure in the aortic system is the conjoint result of these two factors. The first action of *Digitalis* on each is to excite, and the second, to paralyze. If, then, the motor are more stimulated than the regulating nerves, the arterial pressure will be increased; and so it will be if the regulating are enfeebled, while the motor are excited. On the contrary, the arterial pressure diminishes, when the regulating nerves are more strongly excited than the motor.

In a dog, after division of the *vagi*, the pressure rose, after injection of *Digitalis*, from 124 to 260, declining in ten minutes to 176, *millim.* Repetition of the injection speedily arrested the heart's action. There seems to be a remarkable correspondence between these observations and those of Hofschmidt and Moleschott as to the effect of irritation of the *medulla oblongata* and spinal cord on the frequency of the pulse. * * * They found that irritation of the *medulla oblongata* was conducted to the heart through the pneumogastric, and not through the sympathetic nerves; while irritation of the spinal cord was transmitted to the heart through both sets of nerves.

From the above evidence, there seems to be good ground to conclude: (1st) that *Digitalis*, in the milder degrees of its action, has a stimulating influence upon the heart, acting through the *medulla oblongata* and spinal cord, or the cardiac nerves preceding therefrom; (2d) that its stronger action has the reverse effect, like galvanism or mechanical irritation, arresting the heart's movements. How this

arrest is produced is not clear. On the one hand, it may be supposed that overstimulus tetanizes the heart, producing such strong contraction that the ventricles no longer relax to admit blood, which, of course, would bring the circulation to a standstill. This view is supported by the fact that, according to Dr. Fuller's observations and my own, the heart, after death from *Digitalis*, is found with its cavities firmly contracted, contrasting remarkably with the condition produced by *Aconite* and *Chloroform*.*

The above observations, by Hanfield Jones, seem to me conclusive as to the primary exciting action of *Digitalis*. In another place, he alludes to another propable explanation of its fatal action, namely, that "the arrest may be regarded as the result of inhibitory action, the excessive stimulus producing a morbid and depressing effect." This, however, cannot be set down to its primary action. It is the *result* of an extreme of primary excitation; just as fatal paralysis may occur as an immediate *result* of tetanic spasm, caused by *Strychnine*, as well as from the actual tetanic rigidity, or the primary causes of such a tetanic state.

Dr. Jones also says that "*Digitalis* tones and strengthens the action of a feeble heart, but lowers that of a vigorous one." This statement is certainly true, as it is true of the action of all similar medicines.

It is a physiological law, which will hardly be disputed at this day, that *there is no such thing as medicinal action increasing the normal vitality of the organism*. There may be an apparent increase of the vital forces, but it is only *apparent*.

Under the action of *Nux vomica*, in pathogenetic doses, on healthy persons, there *appear* to be greater muscular power, greater tonicity of the motor nerves and greater activity of the physical actions; but these effects are the results of *abnormal irritation*, which are sure to be followed by a corresponding unmistakable depression. But if *Nux vomica* is taken by a person not in good health, whose abnormal condition indicates the use of that medicine, the vital forces are carried up to their normal condition by the pathogenetic force of the medicine, which force is correlated into *curative force*.

The same may be said of the action of the whole class of *restorative* medicines, namely, *China, Hydrastis, Ignatia, Muriatic acid, Helonias, Iron, Ptelea, Ostrya, Phosphoric acid*, etc.

The *primary* action of *Digitalis*, however, is of shorter duration than any other medicine. This is due to its peculiar method of action, *i. e.*, its action on a complex system of nerves.

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* Jones on the Nervous System, p. 320.

The *pathogenetic* primary action of this medicine exhausts itself in a few days, and if the *toxical* or extreme tetanic effects do not appear, the secondary action commences; and this action is apt to be chronic in its character.

When the nervous forces which govern any organ are interfered with, or unduly excited, an impairment of nutrition is the consequence; and in the case of an organ like the heart, which cannot *rest*, this impaired nutrition is productive of the worst results, not only on the heart itself, but almost every organ in the body.

Very few physicians of either school of medicine prescribe *Digitalis*, except in diseases of the heart, or in certain dropsical conditions, due to such diseases.

They do not consider that there are many diseased conditions of any or all the organs which may depend on an imperfect state of the circulation, but in which a physical examination of the heart would fail to detect much, if any, abnormal action.

It is the opinion of many of the most eminent pathologists that a weak heart, by failing to supply organs and tissues with a proper supply of blood, becomes a cause of many serious and troublesome disorders.

Let us inquire what would be the effect of a remedy like *Digitalis*, if given in pathogenetic doses, to a healthy person. As before mentioned, the ordinary medicinal doses of ten or twenty drops of the tincture, or a grain of the crude powdered leaves, would so stimulate, or irritate, the heart that *it would throw an increased amount of blood, with unusual force, into every portion of the body.* The blood, acting as a stimulant, would increase the *normal* activity of each organ, until there would obtain an *abnormal* activity. The pathological condition would be slight, active congestion. The physiological condition would be one of functional irritation. The *brain* would become more active, and all the mental processes be carried on with increased facility. The *lungs* would act more forcibly, allowing longer inspiration and expiration. The *stomach* would feel the effects of the increased supply of blood to its tissues, and a sensation of canine hunger, or heaviness, would result. The *liver*, irritated by the undue influx of blood, would pour out an unusual quantity of bile, and bilious vomiting and diarrhœa would result. The *kidneys*, if only slightly congested, would secrete an unusual quantity of watery urine. Even the *arteries*, under certain circumstances, would be stimulated to forcible contractions.

If, however, a very large quantity of *Digitalis* be taken, at a single dose, or in rapidly repeated doses, we cause a condition like that mentioned by Dr. H. Bence Jones. He says: "On cutting the cervical

portion of the ninth pair, of a warm-blooded animal, the frequency of the heart's pulsations is remarkably increased; and on *tetanizing the extremity of the nerve, which is still, by its cardiac branches, in connection with the heart, its motion is slackened, and may even easily be stopped altogether.*"

In other words, a massive or toxical dose of *Digitalis tetanizes* certain nerves which govern the heart's action, and also *tetanizes* the heart itself. This is abundantly proven by the examination of the hearts of men and animals killed by this poison.

Now, it follows that, whether the heart is only partially, or completely, *tetanized*, the current of blood thrown to the various portions of the body must be partially or wholly arrested. Hence would arise a most complete, overwhelming congestion, or stagnation, which would at once *suspend all function*, and be the starting point for a series of profound derangements. The brain would suffer with coma; the lungs with asphyxia; the stomach with arrest of digestion; the liver would fail to eliminate bile, and the kidneys, urine. If a large dose of *China* should be given in this condition, we need not wonder if it cause the results mentioned by Hahnemann.

This proposition will hold good: That a very large dose of medicine will develop *secondary* symptoms, without causing the *primary*.

In the case of *Digitalis*, a *massive* dose will cause similar conditions to those caused by long-continued *small* doses, namely, paralysis of the heart and other organs.

The *secondary* effect of *Digitalis* is, to cause *weakness of the heart, with irregularity of action; and this condition is reflected by every organ and tissue.*

The discriminating physician, after fixing in his mind the method of action of *Digitalis*, can read the provings of that medicine with an interest altogether new. He will find mixed confusedly together the *primary* and *secondary* effects of the drug; but they can be separated, classified, and made to serve a valuable use as indications for this potent remedy.

In the final consideration of this subject, it is necessary to inquire how far we can make practical use of this discussion. Can we point out the conditions in which *Digitalis* will prove useful, and the dose requisite to cure?

Among the quite extensive list of affections which Noack and Trinks have recorded, as indicating the use of *Digitalis*, we shall mention only a few, to illustrate our views. We shall also allude to its successful use by Allopathic physicians.

Among the symptoms of the mental sphere and the brain indicating

Digitalis are mentioned: "Melancholy," "dementia," "loss of memory," etc. In the pathogenesis, however, we find: "Vivid fancies," "delirium and restlessness," etc., all of which are *primary* symptoms; while the weakness of memory, gloominess, dulness, inability to think, etc., are *secondary* symptoms.

Another series of *secondary* symptoms may, however, be developed, after the heart has become too weak to supply the blood in sufficient quantities to the brain. These symptoms simulate *delirium tremens.*

It is the Homœopathicity of *Digitalis* to irritation of the brain, with deficient nutrition, from lack of due supply of blood, that makes it a curative agent in nervous fevers and the mania of drunkards.

As remarked by Dr. Madden, alcohol must act as an antidote to *Digitalis*, else such large doses as have been given in such cases could not have been borne; for when the powdered leaves are given, a large dose causes aggravations.

Digitalis has been found of great value in neuralgia. We cannot explain its action as being similar to that of the *Belladonna* group. A glance at the true pathology of neuralgia will tell us how it acts. When not caused by organic disease, neuralgia is the result of deficient nutrition. The nerves become irritable, and show the irritation by *pain*, just as an enfeebled brain shows it by *delirium*. *Digitalis*, by strengthening the weak heart, causes it to increase the supply of blood to the brain and nerves, and, as a result, delirium and pain cease.

Hahnemann's provings developed some neuralgic symptoms; and in Hanfield Jones' Treatise on Diseases of the Nervous System, p. 321, we find an account of its usefulness in the treatment of prosopalgia.

In diseases of the stomach, particularly those of a functional character, and due to deficient nutrition—as most of them are—*Digitalis* is a remedy of greater importance than has been supposed.

In the pathogenesis we find many notable gastric symptoms. Besides the intense nausea and the vomiting, we note a peculiar sensation of "*weakness of the stomach*, as if he would die;" "a sinking sensation," which finds its *simillimum* in *Ignatia*, *Tabacum* and *Cimicifuga*. Those who have had much experience in treating cardiac difficulties must have frequently noted this prominent symptom. It is a characteristic symptom of a weakened heart which cannot supply the stomach with its accustomed stimulus. One of the most intractable forms of *dyspepsia* has its origin in this condition, and finds its true and prompt remedy in small doses of *Digitalis*. One of the most practical physicians of my acquaintance informs me that he finds in *Digitalis* one of his most useful remedies in indigestion, heartburn, acidity, nausea and

vomiting of ingesta, and the many unpleasant sensations which dyspeptics feel *after* meals. The *intestinal* symptoms of *Digitalis* are due not so much to a specific influence of the drug on the bowels as to a debilitated heart. There is a diarrhœa; but we fail to find evidences of actual inflammation of mucous membrane. *Digitalis* may prove a valuable remedy in *cholera*, by its Homœopathic action on a weakened heart; but I imagine it will prove most useful in those *choleroid* conditions due to mental emotions, such as fright, anxiety or nervous prostration.

Hahnemann noted one variety of diarrhœa, which demands a more than passing notice. I refer to the following symptom:

"*Ash-colored, papescent stool*, as in a person affected with jaundice; previous to stool, four attacks of vomiting, with previous faintness."

The kind of diarrhœa is evidently due to no kind of intestinal irritation, but to disturbed function of the liver.

This brings us to a consideration of the use of *Digitalis* in diseases of that viscus, and especially that condition known as jaundice. One of the most important functions of the liver is to eliminate the constituents of bile from the blood. If the normal activity of the ultimate hepatic cells is lessened, such an elimination is wholly or partially arrested. In either case, we have jaundice in a greater or lesser degree. The natural stimulus of the hepatic cells is found in the normal supply of healthy blood. If this fails, their action becomes labored and inefficient.

Digitalis, by its *secondary* effect on the heart, lessens the force of the circulation, and brings about the identical condition referred to. Every physician has observed the frequency of jaundice, or hepatic torpor, in connection with some varieties of heart disease. It is in this class of cases that *Digitalis* becomes one of our most useful remedies, not only in cardiac affections, but in many conditions which originate in the liver—conditions which depend on atony of the hepatic cells.

Noack and Trinks mention, particularly, *icterus*, or jaundice, accompanied by a certain group of symptoms, as coming under the curative influence of *Digitalis*. It is rarely used, however, by Homœopathic physicians for that condition. My first experience with *Digitalis* in jaundice was in the early part of my practice, when, in an obstinate case, which resisted all the usual remedies, I resorted to *Digitalis*, with but slight faith in its powers. I was agreeably surprised, however, to find it promptly curative. Since that occurrence I have used it in many cases of jaundice, more or less severe, and with good results. In one case, the jaundice was the result of the patho-

genetic action of *Myrica.** Other remedies failed to restore the function. *Digitalis,* however, in drop doses of the mother tincture, soon brought about the secretion of bile.

The action of *Digitalis* on the *kidneys* is one of the most important, but one of the least understood.

Allopathists believe it to be a powerful diuretic, causing, when it *does* act in that direction, a copious elimination of aqueous urine, containing but a small quantity of solid matters. They note, however, that it does not seem to affect the kidneys in this manner, until after it has had a perceptible effect on the heart.

Hahnemann believed that the usual *primary* action of *Digitalis* on the kidneys was to cause "difficulty of urinating," or "continual desire, with very scanty emission," or even "retention of urine." He notes, in one place, that *retention* followed *enuresis,* but remarks that this is a rare *secondary* effect.

I believe the real action of *Digitalis* on the kidneys may be thus described:

Small quantities, frequently repeated, cause, in the *healthy* organism, an increase in the force of the circulation. This results in an unusual flow of blood into the kidneys, *stimulating* them to increased elimination of water from the blood. If the dose of *Digitalis* is toxical, retention may occur without the previous diuresis; but if the pathogenetic doses be long continued, the weakened heart fails to supply the renal organs with sufficient blood, and a *decrease of urine* occurs, leading, sooner or later, to dropsical effusion, from the non-elimination of the watery portion of the blood.

If *Digitalis* be given to a person with a heart already weakened by disease, diuresis immediately occurs, and the normal discharge of urine returns.

On these results we may base the following propositions:

1. *Digitalis* is homœopathic (*primarily*) to profuse and frequent discharges of urine of a watery character, and attended with a quick pulse.

2. It is *secondarily* homœopathic to scanty, infrequent urine, loaded with solid matters, attended or not with pain, dropsical effusion, hepatic torpor, cardiac debility and irregular, or slow, intermitting pulse.

3. If used for diuresis, diabetes or incontinence of urine, *Digitalis* must be prescribed in the higher attenuations.

4. In conditions to which it is *secondarily* homœopathic, the lower

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* See Hale's New Remedies, page 735.

attenuations, mother tincture, or even the infusion, must be used, if we wish to get curative results.

These two last propositions are in accordance with my Law of Dose, which is well known to all reading physicians of our school.

Hahnemann taught that the diuretic properties of *Digitalis* in dropsy are *antipathic;* but he admits that they are *continuous.* Had he investigated the action of the medicines still further than he did, he would have discovered the law which governs the selection of a dose as resulting from the duality of medicinal action.

He and his disciples would not have been surprised at the necessity of using material doses of this drug for the cure of dropsical conditions.

Digitalis, then, cures or relieves dropsy by its homœopathicity to a weak heart, which it tones up, and influences in such a way as to cause it to supply the kidneys with a normal amount of blood, which blood, acting as a natural stimulus, restores their eliminating function.

Digitalis has been used in some abnormal conditions of the *uterus.* These conditions are characterized by *inertia*, or muscular debility, and are attended sometimes by hæmorrhage. It is a suggestive fact, also, that in almost every reported case there was some cardiac derangement present at the same time.

A medical writer, whose name has escaped me, reports a case of uterine inertia occurring during parturition. With rare intuition, he gave *Digitalis*, because the patient had a weak and enlarged heart. The result was that the uterus acted promptly and performed its functions. No one can doubt that the heart was first acted on, and that the uterine action was but the result of the increased cardiac tonicity. So, in cases of hæmorrhage from relaxation of the uterine vessels, *Digitalis* has been found eminently useful; for, with the return of the normal contractility of the muscular fibres of the heart came normal contractility of the muscular coat of the uterine vessels.

The curative action of *Digitalis* in all kinds of hæmorrhage can be accounted for in the same manner.

Resumé.—As a brief summing up of the subject of this paper, I will offer a few remarks, which I deem of practical importance.

In the proving of medicines the prover should carefully note the *primary* and *secondary* symptoms which are evolved, and ascertain, if possible, where the first series ends, and the second begins.

In the study of a pathogenesis, when this has not been done, the physician should, by the aid of toxical observations, clinical results, etc., ascertain, if possible, and separate distinctly, the two kinds of drug effects.

In other words, he should study *drug* diseases, just as the pathologist studies *natural* diseases, in order that he may have their *natural* history. When this *natural* history of drugs and disease-action is compared, a selection of the right remedy is not in the least difficult.

When the appropriate remedy has been selected, the selection of the proper dose is not any more difficult, if we bear in mind this rule, namely: For *primary* symptoms, the higher attenuations, or *smallest* dynamic doses; for *secondary* symptoms, the lowest attenuations, or *largest* dynamic quantities.

Note. Written February, 1889.—One of the most studiously prepared and thoroughly digested papers which has of late appeared upon this subject is an editorial article in the *Journal of the American Medical Association*, July 28th, 1888. It contains so many appropriate suggestions, and is permeated by such judicious counsel, that we cannot forbear calling attention to some of the points. Digitalis is not indicated by the presence of a cardiac lesion; there must be a cardiac malady. When the patient has entered upon the period of hypersystolism characterized by increased arterial tension, then Digitalis is injurious. Increased arterial tension Huchard regards as the cause rather than the effect of sclerosis, and in the early period of arterio-sclerosis, Digitalis should only be employed with caution.* "It should be remembered always that if we wish to strengthen the heart, we must facilitate and lighten its work." . . . "It is efficacious when the cardiac muscle and the vessels are suffering from asthenia, and when there are œdemas, visceral congestions, dropsies, and the heart beats softly and feebly. When the cardiac muscle is profoundly degenerated, Digitalis is sometimes useful; it may be useless, or it may be injurious. It is in these cases, sometimes, that Caffeine in large doses gives such signally good results." The foregoing teachings, if kept in view, will be the means of saving thousands of lives annually.

ERYTHROPHLEUM.

(Casca Bark.)

The use of this bark was introduced into medicine by Dr. T. Lauder Brunton for mitral disease of the heart. It is the bark of Erythrophlœum guineense, a leguminous tree found in Central and West Africa, and used by the natives as an ordeal poison. It is met with in flat or slightly curved pieces of irregular size, and about a quarter of an inch in thickness, of a dull red brown color, smooth or nearly so on the inner

* In large doses. (*Hale.*)

surface, with a short, granular fracture, very hard externally, uneven, watery and fissured. It is inodorous and has an astringent, acrid and bitter taste. When powdered, it excites violent and persistent sneezing. Great care should be taken in powdering it to prevent the dispersal of the powder in the air, either by moistening the bark with spirits or by covering the mortar with a cloth. The active properties of Casca bark are due to the chrystalline alkaloid erythrophœline, which is soluble in water, alcohol and acetic ether, but nearly insoluble in ether, chloroform and benzol.

The most conspicuous effect of the drug is a general muscular relaxation, so that an animal poisoned with it will remain quiescent in whatever position it is placed. In a fatal dose, vomiting, contracted pupils, slow and irregular action of the heart and a quick and labored respiration are observed, followed by death, with general convulsions and sudden dilatation of the pupils, consciousness being preserved to the last. On examination the membranes of the brain are found to be highly congested. The vomiting takes place whether the drug be given internally or by hypodermic injections, but purging only takes place if given internally. The paralysis is explained by Drs. Brunton and Rye as being due not to a direct action on the muscles, motor nerves or the spinal cord itself, but to the contraction of the bloodvessels lessening the supply of blood to those parts. Dr. Brunton's experiments have shown that it acts directly on the ends of the vagus nerve in the heart, and also on the nerve itself as much as Digitalis does. The final slowing of the heart is due to the action of the drug on the ganglionic apparatus contained in the heart itself. In the Gulstonian Lectures, published in 1877, Dr. Brunton remarks that Digitalis has hitherto been our great resort in mitral disease of the heart, but that in Casca we have probably a drug more powerful still, at least its effects upon the arterioles appear to be greater than those of Digitalis, and it is quite possible that it may succeed in those cases of mitral disease where Digitalis fails.

The action of Casca is to strengthen and slow the heart, to contract the arterioles and increase the secretion of urine. The sign of its toxic action is the reduction in the amount of urine passed, and, when this symptom appears, its use should be discontinued. It does not seem to be a cumulative poison, since, in two days after leaving it off, the urine usually becomes normal in amount.

Dr. David Drummond, who has tried it in several cases, considers it to be a very useful addition to our somewhat restricted list of therapeutic agents for the treatment of cardiac cases, serving, like Digitalis, to lower the pulse-rate, and, whilst increasing the force of the systole, to

render the heart more regular, although in some cases Digitalis acts with more rapidity than certainty. The cases in which he considers Digitalis to be the more suitable drug are those in which stimulation of the cardio-inhibitory centre in the medulla is required, and Casca in those where a remedy to act upon the peripheral inhibitory apparatus in the heart is needed. It appears to act as a diuretic by contracting the arteries and increasing the blood-pressure. Casca does not seem to have been tried as a local or external application in inflammation to lessen the supply of blood by contracting the vessels.

The tincture is a preparation chiefly used, and is made of the strength of one part in ten of proof spirit. It is given in doses of 5 minims, increased to 10.

Prof. Germain See, of Paris, in his Diseases of the Heart, writes: "*Erythrophlœum* and Erythrophleine, discovered by Gallois and Hardy in 1876, in the active principle of the root of *Erythrophleum guineense* of the family of the Legumineuse, is a glucoside which the authors proved experimentally to have a considerable toxic power and a remarkable action upon the heart. Its action upon the heart, as understood, has suggested to us the idea of introducing this substance into the therapeutics of cardiac affections; but it was necessary first to ascertain, by new physiological experiments, the toxic power of this glucoside, and especially to study its principal physiological effects, notably those which might be registered by means of the hæmodynamometer, the sphygmograph and the pneumograph. It is the result of this study which we are about to communicate briefly to the Academy. The researches, begun upon frogs, were continued upon rabbits and dogs. We will only mention the experiments practiced upon these last mammals by means of hypodermic injections of a definite solution of Erythrophleine, because the limits of this article will not allow the report of experiments made upon the other animals, either by the same process or by other methods of introduction of the toxic agent into the organism. 0 gr. 01 of Erythrophleine, introduced under the skin of a dog weighing 9 kilogrammes, was without noticable effect; 0 gr. 02 killed in two hours another of the same kind of 14 kilos. 5. In other words, in case of the dog, the hypodermic injection of one milligramme of Erythrophleine to the kilogramme of animal did not produce any evident toxic effects; 1 mgr. 5, on the contrary, to the kilogramme, was fatal at the end of a few hours. Several comparative experiments established that the toxic effects of Erythrophleine are about the same as those of Digitaline (Amorphous) of Homolle and Quevenne. The first signs of intoxication consist in a little agitation, inquietude, followed by a period of depression, which precedes the

efforts at vomiting or vomiting itself. These latter phenomena are in reality the true initial symptoms of intoxication, and if the dose of poison is not too great it may cease, and the animal promptly return to its normal state. The operation of the circulatory apparatus is disturbed like that of the digestive apparatus. An increase of the intra-arterial blood-pressure is notable, the irregularity and then the relaxation of the pulse already found noted in the memoire of Gallois and Hardy. The period of relaxation is remarkable for the regularity of the heart-beats, for the energy of each pulsation and the uniformity of the intra-arterial blood-pressure. This pressure, in fact, is not modified by the respiratory movements, as it is ordinarily in the normal state, for under (or by means of) the hæmodynamometric or sphygmographic tracings the undulations which result from the influence of respiration upon the blood-pressure in the animal non-intoxicated are no longer observed in the animal submitted to the action of Erythrophleine. This period is followed by another, during which the pulse is extremely weak and accelerated; the oscillations of pressure under the influence of respiration reappear; this pressure diminishes gradually; the palpitations of the heart, more and more feeble, cease now and then, then are arrested definitely, while blood-pressure becomes nil. The respiratory movements seem influenced directly by the Erythrophleine, while at the same time cardiac troubles are influenced secondarily. In a general manner, they are at the beginning slightly relaxed and fuller. When the cardiac pulsations are accelerated during the terminal period of poisoning, the respiratory movements are extremely energetic and more frequent. In almost all experiments, if not in all, the respiratory movements have ceased at the moment of the arrest of the heart. Several times, at this moment, the animal has uttered a great cry. One, two and even three minutes after the cessation of the heart's beating, the respiratory movements have recurred, still energetic for two or three minutes, after which they were definitely arrested. The functions of diverse parts of the nervous system seem troubled by Erythrophleine. Thus, the faradic excitation of the thoracic ends of the vagus nerves in the cervical region did not determine the arrest of the heart in the intoxicated animal as it did in the healthy animal. The quick descent of blood-pressure which occurs under the influence was, on the contrary, manifested equally in the two cases. The frenative or moderative action of the pneumogastric nerve upon the heart is therefore modified by Erythrophleine, and with this substance one can dissociate, so to speak, physiologically, the two circulatory phenomena of the excitation of the cardiac branch of the vago-sympathiques. The faradic excitation of the cephalic ends of

the pneumogastrics, in an advanced period of intoxication, does not induce the acceleration of the pulse which it determined at the first in the normal conditions, but it acts upon the arterial tension as it does ordinarily, that is, by increasing it. Here is again another disjunction of physiological effects. The faradization of the cardiac ends or of the cephalic of the vago-sympathetic nerves induces them in the animal in normal condition, the same modifications of pressure as in the animal which has received the Erythrophleine. The rhythm of the heart, on the contrary, is affected by the same faradic excitations in the animal intoxicated by this alkaloid. When the animal is dying, one can see that the heart is in diastole, flabby, and yet filled with blood. Sometimes the cardiac ventricles are animated by a tremulous movement like that which succeeds the faradization of these ventricles. Generally the heart has not lost its electric contractibility. The pneumogastric nerve preserves its action on the stomach. The excito-motricity of the phrenic nerves is ordinarily diminished, or even sometimes abolished, while that of the sciatic nerve or the sympathetic cervical is not lessened."

GLONOIN (NITRO-GLYCERINE).

I have elsewhere, in our journals, called attention to Glonoin as superior to all other agents as a stimulant to the failing heart in cases of sudden collapse. It acts quicker than stimulants containing alcohol or ammonia, and, although not so rapid in its action, it is much safer than Amyl Nitrite.

In the collapse which attends pernicious malarial fever, in the syncope which occurs in advanced stages of typhoid, in the threatening heart-failure of pneumonia, and even in the utter prostration of cholera and cholera morbus, it is of inestimable value, for it rescues when Digitalis or Strophanthus has not time to act. In such cases it arouses the failing power of the cardiac ganglia, and prepares the way for the successful use of the above cardiac tonics. It will even prolong life for hours when the fatal end is inevitable.

In doses of one-hundredth or one-fiftieth of a drop the heart responds to its influence in less than fifteen minutes.

This substance, named Glonoin by Hering, is pure Nitro-glycerine. The Homœopathic school was the first to use it, and its use by Hering was according to the law of similia. The Allopathic school, a few years ago, commenced its use, but in a different manner. After a study of its physiological effects, they began to use it as an antipathic remedy. Both schools employ it successfully in combating many troublesome

and even grave disorders. It affords an example of the beneficial effects of a drug used in opposite directions. Those of you who have studied its pathogenesis by Hering and others must have a very clear idea of its effects on the human system. But the pathogenesis cannot be perfectly understood until we study it in the light of modern pathology. Without this light, the symptoms of Glonoin seem to resemble those of a purely vascular stimulant. The heart seems to be excited to unwonted action, and to throw the blood to all the organs of the body, especially the brain, with such energy as to cause active congestion. But the fact is that it does not primarily stimulate the heart by acting directly on it. On the contrary, Glonoin acts primarily and directly upon the vaso-motor centres in the brain. It causes a paralysis of the vaso-constrictor nerves. The result is paralysis of the involuntary muscular tissues in the bloodvessels. This causes a dilatation of the bloodvessels, and an immense increase in the area vasculosa. As soon as the vascular area is largely increased, the demand for blood by the dilated bloodvessels is increased, and the heart is stimulated by the decreased resistance. The result is that the action and power of that organ are enormously increased. In this manner are explained the apparent congestion, the increased action of the heart and the vascular turgescence. The object of this paper is not to give the general therapeutical power of this drug, but to point out the cardiac disorders in which it will prove useful. The first disorder to which I call your attention is

ANGINA PECTORIS.

It seems to have been demonstrated by the researches of Potain, Huchard, Herard and others, that real angina is caused by an ischæmia (narrowing) of the bloodvessels of the heart itself. This narrowing may be caused by a spasm of the vaso-motor constrictor nerves of the myocardium, or an ossification of the coronary arteries. In the latter case, all medicines are powerless. In the former Glonoin, or its sister drug, Amyl Nitrite, are potent remedies. They are not primarily homœopathic to such a condition, but secondarily so. Even if only physiologically indicated, the fact remains that Glonoin is invaluable as a palliative, and will often snatch the patient from death. By its power of dilating the arterioles, or paralyzing the vaso-motor constrictors, it allows the blood to re-enter the arteries and the terrible heart-pang is relieved. For similar reasons, Glonoin is potent to relieve those cases of cerebral anæmia due to aortic constriction and insufficiency. This cerebral ischæmia causes those sudden faintings,

syncopal attacks and so-called heart-failures, which are so dangerous unless promptly relieved. There are cases of terrible

CARDIAC DYSPNŒA,

which are promptly relieved by Glonoin. This form of dyspnœa is caused by a constriction of the arteries of the lungs. The heart is powerless to overcome the obstruction, and the patient is in imminent danger of suffocation. The proper dose of Glonoin removes in a few minutes this serious condition by dilating the closed bloodvessels.

PALPITATION OF THE HEART.

This disturbance of the heart's action is often caused by vaso-motor constriction. In such cases, the face, hands and other surfaces of the body are cold, and bathed in a cold sweat; meanwhile, the heart is beating rapidly and wildly, vainly striving to throw the blood into the capillaries. If not relieved, the heart often dies—paralyzed in diastole. Here a physiological dose of Glonoin dilates the closed capillaries, the heart is quieted and a great danger averted. But we are not restricted to the above class of cardiac disorders, for we can use Glonoin in many cases when an opposite condition of the arteries occurs, namely, in paralysis of the vaso-constrictors. This is its homœopathic use. The old school, not believing in the law of similia, considers it contraindicated, and even dangerous, in such cases. So it is in tangible or physiological doses, but not so in minute doses, as the clinical records of our school show.

There are many cases of cerebral congestion due to paresis of the vaso-motor constrictors of the cerebral bloodvessels. They then allow the heart to throw into the brain an undue amount of blood. In young persons this condition is not often dangerous, but in the old who have weak or brittle arteries, it may result in apopletic extravasation. In such cases we find in the third centesimal dilution of Glonoin a specific remedy. Cardiac dilatation, with thinning of the walls of the heart, is another condition to which Glonoin is perfectly homœopathic. Concomitant to this dilatation there is a lax condition of the coats of the arteries, because the heart is too weak to fill them. In such a state Glonoin alone will palliate, and aid a true cardiac tonic, like Digitalis or Strychnine, to enable the heart to regain its power.

CARDIAC IRRITABILITY.

When this condition is caused by long-continued mental strain, or abuse of alcohol or tobacco, Glonoin has, in my hands, proved one of

the most valuable remedies we possess. I have the records of many cases, but owing to lack of time I cannot transcribe them. However, I beg leave to present several cases, similar to my own, reported by Dr. James K. Crook. The doses used by him were the same I have found most useful.

CASE I.—*Cardiac Irritability due to the Excessive Use of Tobacco.*—T. B., male, æt. 71, applied for treatment December 21st, 1886. This patient was formerly an excessive chewer and smoker of tobacco. Ten years ago he suffered severely from attacks of pain over the lower end and to the left of the sternum, together with severe cardiac palpitation. By medical advice he discontinued the use of tobacco, when the trouble gradually subsided. He resumed the tobacco several months ago; within a month the cardiac trouble reappeared, and soon became worse than ever. He then diminished the daily quotum of the weed, but did not abandon it altogether. At this time, he informs me, the attacks came on with unprecedented severity, and he seldom passed an hour without feeling something wrong with his heart. On physical examination this organ was found to be normal in size, but irregular in action, and dropping about two beats to the minute. Patient was ordered to desist from tobacco, and was prescribed one drop of the centesimal alcoholic solution of Nitro-glycerine three times a day. On December 28th, patient informs me that he has found it impossible to relinquish his tobacco, but that he has taken the medicine regularly as prescribed. He expressed great relief; says that for the past two or three nights he has been able to sleep on his left side without inconvenience. The spells are greatly mitigated in severity. On physical examination, also, the heart is found to be more regular and less intermitting than at his previous visit. The patient continued to improve until the middle of January, 1887, when the cardiac trouble had almost completely disappeared, notwithstanding the fact that he persistently declined to abandon the use of tobacco. At that time he disappeared from observation and has not since been seen, so that I am not prepared to say how long the relief continued.

Unfortunately, Glonoin does not always act as well in such cases. I have tried it faithfully in another case of cardiac trouble, plainly due to the effects of tobacco, but with entirely negative results. An account of this case will be introduced here, although considerably out of chronological order.

CASE II.—*Cardiac Irritability and Palpitation due to Tobacco.*—P. M., æt., 37, came under observation November 17th, 1887. This patient has used tobacco constantly since he was 10 years old. Sometimes he will renew his quid every ten minutes during the day, and also smoke several times daily. For the past eight or nine years he has been troubled with cardiac palpitation. His heart will often become excited and beat with painful rapidity without apparent cause. On examination this organ was found to be normal in size, but rather weak in its action, and beating at the rate of 86 per minute. Patient was advised to desist from the use of tobacco, and was prescribed one drop of the one per cent. solution of Glonoin three times a day. On November 29th the patient reports that he has taken the drug as prescribed with great regularity. He states that he

has diminished his daily quantity of tobacco, but was unable to leave it off altogether. There has been no improvement whatever in his symptoms. He says he has had one spell of cardiac distress since his previous visit which eclipsed all others in severity. The medicine always gives him a headache a few minutes after being taken. Ordered Glonoin continued in double doses (gtt. ij, cent. sol., t. i. d.), and again insisted upon the necessity of discarding tobacco.

December 3d.—Patient still finds no relief whatever, although he has taken the medicine in exact accordance with my instructions. He has limited himself to three chews of tobacco daily, but cannot stop its use altogether. Physical examination shows the heart to be beating at the rate of 94 per minute. Ordered Nitro-glycerine increased to three drops three times per day. Even this amount has failed to improve the excitable and irritable condition, and it has been discontinued and replaced by compound spirits of ether The latter drug has also failed to produce any relief so far. It is possible that no improvement will occur in the case until the complete discontinuance of tobacco.

CASE III.—*Double Aortic Lesions complicated by Intense Paroxysms of Angina Pectoris.*—J. M., æt. 40. This patient was first seen February 22d, 1887. He was found to be suffering from double lesions of the aortic valves, with advanced cardiac hypertrophy and dilatation. The case was marked by most distressing spells of angina, which frequently came on several times a day. The patient was afraid to go to bed, as the seizures were especially severe at night, and frequently rendered sleep impossible. These attacks presented the principal indication for treatment, as the disease had evidently progressed too far to admit of any hope of re-establishing cardiac compensation. As the patient was under my constant observation until his death, on the 20th of September, ample opportunity was given for comparing the effects of different remedies for angina pectoris. Among the medicaments prescribed for this complication were several preparations of opium, the iodide of potassium, the bromides, Hoffman's anodyne, valerian, asafœtida and finally Nitro-glycerine. All these remedies were eventually abandoned except the latter. It was found to be the only agent which would arrest or ameliorate the paroxysms with any degree of certainty. It was at first prescribed in drop doses of the one per cent. solution, three times a day, and one drop every fifteen minutes at the supervention of a paroxysm. In this manner the attacks were rendered far less frequent, and their severity greatly diminished. Before the patient's death, however, it was found necessary to greatly increase the dose. Sometimes as much as fifteen or twenty drops of the usual solution would be required to tide him over a paroxysm. It is my belief that the patient's life was considerably prolonged by the use of Nitro-glycerine. His last days were certainly rendered far more comfortable.

CASE IV.—*Aortic Stenosis with Weak Heart and Severe Breast-pang.*—J. M., æt. 54, applied for treatment March 31st, 1887. This case presents no features of special interest beyond the fact that Nitro-glycerine was found very efficient in relieving palpitation and sensations of impending death with which the patient was frequently troubled. Its effects were not permanent, however, as the patient, when last seen (in September), still had occasionally very severe visitations of the attacks of cardiac pain and dyspnœa.

CASE V.—*Simple Cardiac Palpitation of Neurotic Origin.*—J. S., æt. 25, came under observation May, 1887. This was a case of ordinary nervous cardiac irritability due to mental anxiety and a somewhat hypochondriacal disposition.

A physical examination showed the heart to be quick, sudden and overforcible in its action, but there was no evidence of organic disease. This patient is still under my observation. He has taken various remedies for the palpitation, but none has produced such good results as Glonoin, given in the usual dose and manner. He claims to have practically recovered, but at long intervals he begins to feel a return of the trouble, when he immediately applies at the clinic for a renewal of the remedy.

CASE VI.—*Chlorotic Anæmia, with Intense Seizures of Thoracic Angina.*—Cora F., æt. 19. This patient has been attending the clinics at the Post-Graduate School since the summer of 1885. She has had chlorosis of a most obstinate type for several years. Her disease is characterized by extremely violent attacks of cardiac distress, which sometimes approach very nearly to true angina in severity. She will attend the clinics with great regularity for a few weeks, become somewhat improved, and then disappear, not to return again, until the symptoms are as severe as ever. This has been her history for the past two years. Various sedatives, antispasmodics and diffusible stimulants have been prescribed, but with only temporary relief. I finally resorted to Nitro-glycerine, and with such success that I have so far found no occasion to prescribe any other remedy for the cardiac symptoms since the beginning of its exhibition. It has seemed to me to act more efficiently and speedily than any other agent which I have used for the case. Taken at the beginning, it will almost surely abort an attack, or greatly ameliorate its violence. These spells have ceased altogether for ten days or two weeks at a time while the patient was under close observation. It is my belief that the vigorous exhibition of some reliable preparation of iron, such as the Blaud pill, together with Nitro-glycerine, for a few months, would go far towards effecting a permanent cure in this case.

CASE VII.—*Simple Nervous Palpitation, Arhythmia.*—T. K., æt. 27, applied for treatment November 12th, 1887. This patient has suffered from cardiac palpitation and præcordial distress for more than a year past. He finds it impossible to sleep on his left side. Various remedies have been prescribed, but with very little benefit. He is familiar with most of the ordinary remedies for cardiac palpitation. The patient is a man of good habits, and uses very little tobacco or alcoholic stimulants. On examination the heart was found to be quick and nervous in its action and very intermittent, dropping from five to seven beats per minute. The pulsation would be very rapid for ten or twelve beats, and then become slow and apparently labored. There was no murmur, nor any enlargement or other evidences of valvular lesions. Ordered Nitro-glycerine in the usual commencing doses.

November 15th.—The medicine has been taken according to directions. It has caused more headache than usual, but the palpitation has been greatly benefited. Patient says he could sleep on his left side last night, for the first time in months. Ordered Nitro-glycerine to be continued, together with a laxative for the bowels. Heart not examined.

November 22d.—Patient has become very enthusiastic with reference to the virtues of Nitro-glycerine. It has relieved him more than any remedy he has ever taken. An examination of the heart sustained this favorable account of the drug. It was found to be more regular in its action and less intermittent, losing but four beats per minute. The head symptoms produced by the medicine have become scarcely perceptible. Ordered Glonoin continued in double doses.

November 26th.—The improvement has continued. The palpitation is greatly abated, and the heart loses but two beats per minute.

This patient has been twice seen subsequently. Early in the present month he stopped the Nitro-glycerine for a few days, when there was, almost at once, an exacerbation of the symptoms. He is at this time (December 17th) taking the remedy in two-drop doses four times a day, and is apparently steadily improving.

The foregoing cases, seven in number, sufficiently illustrate the action of Nitro-glycerine in the ordinary forms of heart disease met with in practice. I have observed the effects of the drug in twenty-eight different cases, and in only four has it absolutely failed. In all the others more or less relief was obtained, and in some the effects were most gratifying. As far as I have been able to judge, however, its effects are only temporary, even in cases independent of organic lesions. It may be regarded simply as a symptom-medicine, and one which probably exerts little, if any, permanent effect on the course of diseases of the heart. It undoubtedly has its sphere in the treatment of painful and irritable conditions of this organ, however, and for the temporary relief of these conditions it has seemed to me to be rather more reliable than any other single remedy.

GLONOIN AND DIGITALIS.

A new and interesting use of Glonoin has lately been suggested and tested by Professor W. H. Thomson, of New York. In a recent paper (*Medical Record*, May 19th, 1888) he says of Digitalis: "We all know, now, that one of the commonest causes of cardiac dilatation is not to be found in the heart at all, but in *an obstructed arterial circulation.* It is probable that arteries narrowed in their calibre are the cause of cardiac hypertrophy and subsequent dilatation three times in adults to valvular disease of the heart once; and just here it is that the employment of Digitalis in heart-failure so often disappoints us most signally, for, unfortunately, while it increases the contractile power of the heart, it also contracts the arteries, and thus often adds as much obstruction to the circulation in that way as it aids the circulation by its increase of the heart's propulsion—a fact often illustrated in cases of dropsy from Bright's disease, where the condition of the systemic arteries is the primary cause of the anasarca. It is in just such cases that Nitro-glycerine can help us to administer the Digitalis with more than double the beneficial effects of the administration of Digitalis singly. Nitro-glycerine, by its universal and prompt relaxation of the whole arterial system, makes every stroke of the ventricles stimulated by Digitalis not only more powerful, but also far more effective, in completing the systole with a short and heart-emptying

contraction. Meantime, by its action in paralyzing the inhibitory action of the vagus, it insures a more rapid diastole, and in many instances I have found the intermittency caused by Digitalis to disappear as soon as the effects of the Nitro-glycerine are felt. The effect of this upon the anasarca in these cases is about as complete and gratifying as any remedial operation with which I am acquainted. But, on the other hand, the influence of Nitro-glycerine alone, as I have noted in a number of instances, is almost *nil* on the dropsy, however much it often seems to have a beneficial influence on the secretory action of the kidneys by increasing the specific gravity of the urine."

GLONOIN WITH STROPHANTHUS.

The new cardiac remedy, Strophanthus, does not contract the systemic arteries nearly as much as does Digitalis. But Dr. Thomson finds that alternating Glonoin with Strophanthus greatly increases the value of the latter in weak heart combined with contracted arteries. He gives several interesting cases illustrating the combined action of Glonoin and Digitalis, and Glonoin and Strophanthus, and the results were very happy. His usual doses were three to five drops of Digitalis or Strophanthus, continued with one to two drops of the one per cent. solution of Glonoin (our 1c dilution). Since reading Dr. Thomson's paper, I have had an opportunity of testing his practice. It was in a case of cardiac dilatation, with enormous anasarca, in an old man. The arteries were very tense and rigid, due to atheroma. There were great dyspnœa and quick, intermittent pulse. Digitalis had been given alone by a former attendant, in ten to fifteen-drop doses three times a day—rather aggravating the symptoms. I prescribed three drops of Digitalis tincture every four hours, alternated with one drop Glonoin, 1c, every four hours. In less than twelve hours the beneficial effect of this method was manifest. The dyspnœa was relieved, the cold extremities became warmer, the urine increased greatly, and the pulse and heart action became nearly regular. The dropsy disappeared in a week.

I have for several years used Aurum in such cases; it has about the same effect on the arterial system as Glonoin, but is not so prompt. Aurum mur. et sodii in doses of one-hundredth or one-fiftieth grain is the best preparation.

The *Nitrite of Soda* is quite as active as Glonoin, and has been used as a substitute for that medicine. Neither is as rapid in its action as the Nitrite of Amyl.

If a Nitrite could be found that would lower arterial tension without

causing the unpleasant throbbing and flushing, it would be very desirable.

Such a remedy, perhaps, is the

COBALTO-NITRITE OF POTASSIUM.

In the *New York Medical Journal* for August 25, 1888, in a preliminary note, Dr. J. West Roosevelt calls attention to a drug which seems likely to prove of some value in cases where it is desirable to lower arterial tension, or to produce any of the physiological effects of the various Nitrites now in use, and to sustain these effects for some time.

Dr. Walcott Gibbs suggested to the author that Cobalto-nitrite of Potassium might be of value in certain cases, on the ground that its stability and relative insolubility would probably cause a slower, more uniform and more easily controlled action than that of Nitro-glycerine Sodium Nitrite, Amyl Nitrite, or Ethyl Nitrite.

He further stated that the salt could easily be prepared in a state of absolute purity, and would have the advantage of not being deliquescent or subject to chemical change.

When a solution of Potassic Nitrite is mixed with a solution of a salt of Cobalt, previously acidulated with Acetic Acid, a crystalline precipitate is formed, varying in color from bright yellow to a dull olive shade. This salt was discovered many years ago by Fischer, and, according to Sadtler, has the formula $Co_2 (N O_2)_{12} K_6 + {}_2$ Aq. The salt may be considered as derived from the acid $Co_2 (N O_2)_{12} H_6$.

Acting upon the suggestion of Dr. Gibbs, the writer gave the salt to a dog, weighing about eight pounds, in a dose of five grains. No other effects than drowsiness and probably lowered tension and more rapid pulse were produced. The dose was repeated several times on different days. As there was no apparatus to measure blood-pressure at hand, no attempt was made to ascertain anything save whether the salt was actively poisonous or not. A dose of seven grains produced no symptoms in another dog of about the same size. A pregnant cat took about five grains without toxic effect. In the dogs examined there seemed to be increased speed in the pulse and a fall in tension as appreciated by the finger. The temperature also fell from 2° to 4° F. In the absence of precise observations the experiments are of little value.

As the animals certainly suffered from no dangerous symptoms, the drug was tried in various cases in the Roosevelt Hospital. The dose usually given was half a grain every two to four hours. It was given in a few cases in half-grain doses as often as every hour. The cases

chosen were those in which the other Nitrites are often found to be of value.

Three cases of uræmia, with high arterial tension and dyspnœa, with and without signs of œdema of the lungs, were selected. In two an attempt was made to compare the action of Nitro-glycerine and the new salt administered alternately in the same case. The tension, as shown by the sphygmograph or finger, fell in from fifteen minutes to an hour. The dyspnœa was wonderfully relieved in two of the cases and in one of these, where Nitro-glycerine was given alternately with Cobalto-nitrite, there was no doubt (in the patient's mind at least) that the effects were more lasting as regards the relief from dyspnœa with the latter, and that it produced no fulness, throbbing nor pain in the head, while Nitro-glycerine had caused a great deal. In the other case in which the two drugs were given alternately, neither seemed to give much relief to the symptoms, and after use of the Cobalto-nitrite was begun there was vomiting. Whether this was caused by the salt or the uræmia cannot be told. In the third case the salt gave absolute relief from the dyspnœa and produced neither headache nor vomiting. A fourth case of uræmia presented head symptoms without dyspnœa. Here the patient became better after taking the drug, but it is very doubtful whether this result was post or propter hoc. The improvement continued after the salt was stopped, and the patient passed from under observation.

A case of emphysema of long standing, with severe asthmatic seizures, was completely relieved of the dyspnœa by the drug, so far as the subjective symptoms or chest signs are concerned. In this case also Nitro-glycerine was tried. The relief obtained by the latter was the same, but there was headache with it, while the Cobalto-nitrite did not seem to cause any.

Since then the patient again came under the writer's care in Bellevue. The Cobalto-nitrite relieved in great measure the dyspnœa, and completely abolished the sibilant and sonorous râles which at first were audible.

Nitro-glycerine, in doses of $\frac{1}{100}$ of a grain, failed to produce any effect. Cobalto-nitrite, in doses of one-half grain every hour, caused headache, but one-half grain every two hours decidedly improved the subjective and objective signs, and caused no head symptoms.

In a case of cardiac valvular disease, in which there were dyspnœa and œdema of the lungs and very pronounced albuminuria (the urine also containing hyaline and granular casts) the tension was lowered, but no positive good results were obtained. In this case the patient had vomited before taking the drug, and continued to do so afterwards.

Possibly the vomiting was more severe after than before. In the case of a woman, 70 years old, with somewhat thickened vessels, an attack characterized by severe headache, nausea and vomiting, very high arterial tension, restlessness, slight albuminuria, with urine of normal specific gravity, containing a few hyaline casts and rather numerous leucocytes, was relieved by Chloral.

This drug, when given in efficient doses, caused drowsiness. The Cobalto-nitrite was substituted, tablet triturates of one-fourth grain each being administered every three hours, and the same relief without any drowsiness was obtained. When the drug was discontinued, the headache, etc., returned, and relief again followed its use.

In a case of lead colic, with high arterial tension, the drug lowered this, but did not relieve the pain.

A case of mitral stenosis, with marked albuminuria, improved under the use of this salt with Digitalis; but it is not possible to say what share the Cobalto-nitrite had in this result.

It seems to the writer that this salt is worthy of trial in all cases where Nitrites are now used. Besides the cases mentioned, he has a number of others under observation, and it is his intention to publish a detailed statement of his studies as soon as a sufficient number of cases have been observed and satisfactory experiments have been made upon animals. The experience with it so far has been encouraging. It is easily prepared, cheap, stable and safe. It seems probable that we shall find that it lowers arterial tension, and that it does not produce so much discomfort as the other Nitrites.

The effect of the drug seems to begin in about fifteen minutes to one hour after its administration, and to last (in some cases at least) for three or four hours. The average dose given has been half a grain every two or three hours. It is possible that this may be largely increased, but the fact has not been proved. It is also possible that vomiting may have resulted from its use in two cases mentioned. It seems to relieve more or less the dyspnœa of uræmia and of asthma. A grain or two of the 1st trituration, frequently repeated, might give better results.

OLEANDER AND ITS ALKALOID, OLEANDRINE.

Oleander was introduced into Homœopathic practice by Hahnemann, but Galen and some of the ancient physicians used it. Its active principle, "Neirin," or "Oleandrine," has been found to act as a heart-poison.

Oleander affects the brain like a narcotic, causing loss of memory

and the power of concentration, also stupor and coma. It causes pressing-out pains in the forehead and vertex like Cimicifuga. It causes dilated pupils, blackness before the eyes, etc. It paralyzes the tongue, causing loss of speech. Its heart symptoms are "dull-drawing pains about the heart, more violent on stooping (*Spig.*), and lasting during expiration. Distress at the heart and anxiety; anxiety about the heart, without anxious thought, with trembling of the whole body. Quick pulse, sinking to a thread. Pulse small, irregular, periodically intermitting. Pulse weak and very slow. Intermission every four or five beats. Pulse very irregular, at one time rapid, another very slow; at one time full, another very soft and weak. Perceptibly violent and full, but slow pulsations in the carotids. A pressure seeming to press from below upward in the anterior cervical muscles, so that he was obliged to loosen the neckband—a suffocating, choking sensation."

The above symptoms would seem to indicate it is some functional disorders of the heart, as well as organic. A study of its most characteristic symptoms, as well as the observations below collected from various sources, will enable us to prescribe it intelligibly. The doses of the active principle is about the same as of Digitaline.

It has long been known that the ordinary Oleander, or Nerium odorum, is a poisonous plant, and it is asserted that almost from time immemorial the root has been employed in some portions of Southern Europe for the purpose of destroying rats.

Cases of poisoning of the human being by it have been infrequent, but have occurred. In the *Journ. de Chem. Méd.*, 1843, Professor Richard gives an account of the poisoning of a troop of French soldiers as the result of eating meats, which had been roasted before an open fire, composed of Oleander blossoms. Seven died and five others were dangerously sick.

According to M. Julien Larue du Barry, in 1841, five French soldiers in Algeria ate food which had been cooked with the wood of the Oleander. Three hours afterwards they were all taken to the hospital in a condition of poisoning. The symptoms were dilatation of the pupil, vomiting, frequent cries, apparently the result of abdominal pain, convulsive movements of the limbs, vertigo, and in two cases insensibility. All recovered. In 1859 (*Ztschr. d. k. k. Gesellsch. d. Aerzte zu Wien*, 1859, xv. 690, 785, 801), Dr. Kurzak published quite a long article upon the poison, in which he cites a number of cases. In one of these $1\frac{1}{10}$ gramme ($16\frac{1}{2}$ grs.) of the extract is said to have produced violent vomiting and cold sweats, fainting and other symptoms; in another $5\frac{1}{5}$ grammes (78 grs.) of the extract caused

death. At the autopsy the blood was found dark and imperfectly coagulable, while there was much injection as well as inflammation of the gastro-intestinal mucous membrane. In still another case, a child, 3½ years old, swallowed two of its little handfuls of the blossoms. In ten minutes restlessness came on, followed almost immediately by vomiting and apparent recovery of the normal condition. Some hours afterwards the boy was put to bed, and when, still later, his father went to him, he found him unconscious, motionless, excessively pale, with very small (?) pupils and cold extremities.

The child remained for some hours in a condition of unconsciousness, with an intermittent pulse, but finally recovered. In these various cases the symptoms are stated so imperfectly that they throw little or no light upon the action of the drug. More recently better observed cases have been reported, the most satisfactory being that recorded by Dr. C. Sibthorpe (*Indian Med. Gaz.*), 1881, the case of an adult Hindoo, who took the root of the Nerium odorum in unknown amount for the purpose of suicide. Before going to the hospital he had vomited. At the time of the entrance the pupils were dilated and fixed, the pulse small, very slow—36 per minute—the respiration unaffected, the skin normal, the gait staggering, the mental condition dazed. Two hours later epileptiform convulsions came on; the temperature fell in the axilla to 97.4, and semi-coma developed. After this, violent convulsions similar to those of hystero-epilepsy occurred about every half hour, lasting each one and a half minutes. The temperature rose to 101, the pulse to 120. Twelve hours later the patient was still semi-unconscious, the pulse slow—40 a minute—the respirations 18, the temperature 98. Thirty six hours afterwards the pulse was still 40 per minute. Five days afterwards the pulse was 44 per minute, and the patient showed evidences of mild mania, in restlessness, singing, etc., and said that he had got a god in his abdomen and wanted a piece of glass to cut him out. He finally recovered. In a case reported by Dr. D. Murray (*Indian Med. Gaz.*, 1887, p. 389), an infusion made from four ounces of the Oleander root was taken at 8 o'clock in the morning. In about an hour the man was seized with vomiting and severe cramps in the abdomen and extremities. About an hour later he became insensible, but was first seen by the doctor near 4 P.M. He was then unconscious, with cold, clammy skin, weak, thready pulse, stiffness of the jaw muscles, and rigid fingers. There were also frequent convulsive spasms.

He was under treatment for two nights and one day, when he was removed to his home still unconscious, with increasing collapse. He died five days after taking the poison.

It has been asserted that the Oleander is capable of acting as a violent local irritant, and Dr. J. A. Wessinger attributes an extensive eruption on the face, with blebs and large papules, accompanied by intolerable itching and burning, to the local effect of the Oleander bush (*Detroit Lancet*, 1882). At present it is not clear, however, that the drug has such influence. Animals have occasionally been accidentally poisoned by Oleander.

Thus Dr. Kohlmann gives an account of a cow and two goats, which were given leaves from two Oleanders along with other food. Both animals were affected with coldness of the nose and extremities, marked tremors in the posterior extremities, and cramp-like contractions of all the muscles. The goat finally passed into a general paralytic condition, and died about eleven hours after feeding. Twenty-four hours after feeding, the cow also died paralyzed (*Centralbl. f. Klin Med.*, vol. i., 161).

Orfila made experiments upon dogs with the aqueous extract of the leaves of the Oleander, and found it to be locally irritant and an active general poison, whether thrown into the stomach or into the veins, especially influencing the nerve-centres and causing stupefaction with paralysis, and in most cases vomiting. He noted that immediately after death the heart was usually found in a condition of rigid contraction. The first person, however, to make experiments with Oleander, according to the modern method, was M. E. Pelikan (Compt.-Rend., 1866, p. 239). He found that in the frog the extract of Oleander causes immediate increase in the number of the heart-beats, followed after a little by slowing of the cardiac movements, and later by irregularity of contraction, ending in systolic arrest of the ventricles at a time when the auricles continue to beat and the frog is still able to jump about freely. Pelikan's experiments upon dogs have not, we believe, been published in detail, but he states that they led him to the conclusion that the Oleander acts in the mammal upon the heart in the same way as does Digitalis. He also convinced himself that the active principle was a yellow resinous principle, insoluble in water, easily soluble in amylic alcohol and chloroform, previously discovered by M. Latour (*Journ. de Pharm. etc.*, xxxii., p. 32).

M. Leukowski claims to have discovered (*Journ. de Pharm.*, 3d series, vol. xivi., p. 397) two alkaloids, one named Pseudocurarine, and the other Oleandrine.

In the *Archiv für Exper., Path. und Pharm.*, 1883, vol. xvi., p. 149, Professor Schmiedeberg published the result of an elaborate chemical study of the Oleander leaf. He found that the leaf contains two active substances, to one of which he gave the name Neirin. He

believes it to be identical with or very closely allied to Digitaline. The second substance, Oleandrine, had been previously described by Leukowski and by Betelli.

Schmiedeberg also obtained from African leaves another glucoside, Neriantin, which he surmises to be an educt from Oleandrine.

Schmiedeberg found Oleandrine to be a very powerful cardiac poison, 25 milligrammes being sufficient to cause systolic arrest of the frog's heart. The glucoside, Neriantin, was not able to arrest the heart of the frog, although it had some influence upon it, possibly, as Schmiedeberg surmises, through contaminating Oleandrine.

Very recently (*Bull. de Therap.*, May 15th, 1888) a partial study of the physiological action of Oleander has been made by Dr. Pouloux. He has found that in doses of 5 centigrammes ($\frac{3}{4}$ gr.) the extract produces in the frog paralysis, and death occurs in from thirty-five to forty minutes; that the ventricle is thrown into a state of tetanus, so that the diastole is incomplete, at a time when the number of cardiac beats are neither augmented nor diminished, and that in five minutes after the injection the tetanus of the ventricle is complete, the auricles continuing to contract over a considerable length of time. The mortal dose for the rabbit is about 50 centigrammes ($7\frac{1}{2}$ grs.) of the hydro-alcoholic extract, death occurring usually in about forty minutes. The heart continued to beat in all cases some minutes after death, but the aorta was found full of blood, the venous system engorged, and the movements of the heart exceedingly feeble, so that the death was attributed by Dr. Pouloux to the cardiac action of the drug.

In the above paragraphs has been summed up all the knowledge that is obtainable in regard to the action of Neirin upon the animal organism. It appears to show that the drug really does belong to the Digitalis group of poisons; but before our knowledge can be considered at all definite, it is essential that a much wider series of experiments should be made.

Under the control of Dujardin Beaumetz, Dr. Pouloux has made a few studies of the influence of Oleander in cases of heart disease.

He affirms that under its action the beat of the failing heart has become regular, and the filiform, imperceptible pulse full and hard. In several of the cases there has been marked increase of the urinary secretion, and in some the disappearance of widespread œdema. He administered the extract in pill form in doses of five centigrammes.

THE ACTION OF SCOPARIOUS (BROOM) AND ITS ALKALOID, SPARTEINE, ON THE HEART.

Broom is a very old English remedy for dropsy. It is a common plant or shrub, growing all over England, and was used for dropsy by the people long before it was used by the regular profession. In Culpepper's *Herbal* it is recommended as a purgative and diuretic, and for scruvy, dropsy, sciatica and jaundice. In large doses it causes considerable irritation of the kidneys and urinary passages. The ashes contain a large quantity of carbonate of potassa, to which its virtues were once supposed to be due. It has a volatile principle which was supposed to be similar in its effects to *conia* and nicotine.

No provings have yet been made by the Homœopathic school, but its active principle, Sparteine, has been made the subject of recent experiments by Allopaths. But this principle, which was supposed to be volatile, is now proved to be the one which acts specifically upon the heart. Another active principle, Scoporin, isolated by Dr. Stenhaun, was supposed to be its *diuretic* principle, but Schroff, who tested it in several cases, observed no diuretic effects—only colic and borborygmi. A decoction of the tops of the plant is the official preparation, but a tincture of the seeds is pronounced more active in dropsy.

Like many other cardiac remedies, it is probable that it acts on the kindeys and urinary passages, as well as upon the heart, as do Digitalis and Adonis. Homœopathic provings should be made of a perfect tincture of the whole plant, seeds and all, if we wish to get a picture of its general effects.

Dr. Cullen was the first to introduce it into regular practice, after hearing of its popular uses.

He employed it in dropsy, directing half an ounce of the fresh tops to be boiled in a pint of water, down to one-half that quantity. Of this he prescribed two tablespoonfuls every hour until it operated by stool. It seldom failed, he says, to operate both by stool and urine, and by repeating the dose, every day, or second day, some dropsies were cured. Sydenham used the ashes of Broom successfully for an anasarca, which followed an epidemic catarrh which prevailed in Sweden in 1757. Dr. Itard relates that about 1788, the French government published, as a specific for dropsy, a prescription consisting of the powdered seeds of Broom, and that it had "almost miraculous effects." Dr. Pierson considered it superior to other diuretics, as it "improved the appetite and invigorated the whole system." He states that it was most successful in ascites and general dropsy. Pareira declared that it was more

certain than any other diuretic. "Indeed," he says, "I cannot call to mind a single case in which it failed to act on the kidneys."

All this is pretty strong testimony, but at the time of the above writers the pathology of dropsy was a mass of chaotic opinions. The causation of the various forms of dropsy had not been investigated, and especially the part played by a diseased and weakened heart was quite unknown. Only lately has broom been known to be useful in cases of cardiac dropsy. You will see that its history resembles that of nearly all cardiac remedies. Even Apocynum cann., which until within a few years was supposed to be a purely renal remedy, is now believed to owe all its virtue in dropsy to an alkaloid, Apocyninin, which acts as a cardiac tonic.

It is true that none of these active principles or "glucosides" act just alike. They cannot be used indiscriminately for cardiac dropsy. One case may yield to Digitaline—another will not, but can be cured by Adonidin. One will have its remedy in Convallarin, another in Sparteine, and so on. Sparteine or the Sulphate, which is better, does not act like Strophanthine.

The late experiments of Dr. Gluzinski, both physiological and clinical, with the Sulphate of Sparteine, show that its main action is to slow the heart, and to raise the blood-pressure. Now, in all cardiac dropsies, the failure of the kidneys to carry off the fluids is due to a lowering of the blood-pressure, especially in the kidneys.

Sparteine acts with greater intensity on cold-blooded animals than on mammalia. Its action on the latter may be divided into three periods or stages, during the first and last of which the effects are more marked than during the second. Indeed, in some cases, the heart is even quickened during the second period. This may be explained by the existence of some abnormality or pathological change in the irritability of the vagus, or the heart muscle. The reflexes are at first increased, afterwards diminished. Death occurs from asphyxia, and is due not only to the effect on the medulla, but to that experienced by the respiratory muscles. The therapeutic effect of Sparteine is limited to the first stage of its action. Its value consists in the rapidity with which it acts. In some cases within an hour after the first dose, the pulse begins to improve, as well as the subjective sensations of the patient, and no irregularity is produced. (In this respect it ranks after Glonoin, whose effects on a failing heart are observed in less than half an hour). Sparteine has not so powerful an action as Digitalis. It may, however, be useful in cases where the condition of the patient renders it inadvisable to wait for the more tardy effect of Digitalis, and it may therefore be used as an adjunct to the latter drug, besides which

it may be prescribed where circumstances exist which contraindicate the use of Digitalis.

The foregoing is the opinion of Dr. G., but further experience may modify or change the estimate. But it certainly bids fair to be a valuable addition to our cardiac remedies.

Dr. Germain See uses Sparteine largely in his clinic in Paris for mitral insufficiency and aortic regurgitation, with weak heart, and prefers it in most cases to Digitalis. He thinks it equal to Convallaria.

Hans Voigt, working in Nortengale's clinic, has come to the following conclusions respecting the therapeutic action of Sulphate of Sparteine: In small doses the salt increases the efficiency of the cardiac contractions and raises the arterial pressure. The number of heart-beats are always increased. These effects are observed within an hour of the administration of the drug, and continue for twenty-four hours. The author recommends the suspension of the administration of the drug for some days, but it may be given for a week without risk. The remedy does not always regulate the rhythm of the heart-beats. Its action on the respiration is variable. Diuresis appears to take place in proportion to the improvement of the cardiac action. A beneficial sedative action is often observed. Headache, vertigo, malaise and other objectionable symptoms were but rarely met with as the result of administration of small doses. The dose employed has been from 1 to 4 milligrammes ($\frac{1}{100}$ to $\frac{6}{100}$ gr.) It will be remembered that in See's hands much larger doses, 5 to 20 centigrammes ($\frac{3}{10}$ to 3 gr.), were tolerated without cumulative or other objectionable effects.

My own experience with Sparteine has been limited to a few cases of mitral insufficiency when Convallaria was not well borne, and Adonis caused gastric irritation. When it does act, it is with promptness and certainty.

I usually prescribe the 2d trituration of the Sulphate to begin with, giving five to ten grains every three hours. If the desired effects do not appear in twelve hours, I give two grains of the 1st. So soon as the heartbeats have acquired more force and become slower, the frequency of the dose is lessened.

It does not regulate the rhythm of the pulse as well as Digitalis, but an arythmical pulse is often present where the heart is doing good work. I have had no experience with the tincture of Broom. In a few cases I have used the infusion, but the results were not satisfactory.

Dr. A. Maslowski (*Russk. Med.*, Nos. 11 and 13) has recently used Sulphate of Sparteine in three cases of cardiac diseases, which were as follows:

1. Pulmonary emphysema with bronchitis and chronic myocarditis.

2. Pulmonary emphysema with irritable heart.

3. Insufficiency of the aortic valves and aneurism of the aortic arch.

His observations regarding the action of the drug (as prepared by E. Merc) have led him to the following conclusions:

1. Sparteine, when given in medium doses, excites the heart's action, whereby its contraction becomes stronger and the pulse fuller. The rapidity of the pulse is generally somewhat decreased.

2. The action of the drug is very rapid. The rhythm of the impaired heart's action is not entirely restored, although the contractions become considerably stronger.

3. The quantity of urine is greatly increased by the drug. Cumulative or unpleasant accompanying effects were never observed.

Voigt and Leo have, through recent papers, added to our information as to this alkaloid. According to the analysis of their papers, published in the *Med. Chron.* for April, 1887, Voigt found that Sparteine, in doses of $\frac{1}{6}\frac{1}{5}$ to $\frac{2}{6}\frac{2}{5}$ grain, in a series of cardiac and other diseases, stimulated the heart, increased the contractions, and raised the blood-pressure. It acts quickly, and its action lasts often over twenty-four hours, during which time the effect can be increased by a repeated dose.

A pause of a few days after continuous administration is useful, as the drug acts the more forcibly afterwards. He finds it to be a diuretic, but not one of first rank. Toxic symptoms, very seldom observed with doses of 1 to 4 mg. ($\frac{1}{6}\frac{1}{5}$ to $\frac{4}{6}\frac{4}{5}$ grain), were faintness, headache, palpitation and uneasiness, which soon disappeared, even when the use of the drug was continued.

Voigt would recommend Sparteine for therapeutic use:

1. In valvular disease with failing compensation.

2. In valvular disease, without faulty compensation, as a tonic and sedative.

3. In weak action of the heart without valvular disease.

4. In pericarditis.

5. As an adjuvant to Digitalis.

Leo exhibited Sparteine in doses of 0.1 gm. (1½ grains), every two hours, in twenty-four cases. In only nine of these was there any objective result definitely traceable. In the remaining fifteen cases, eight showed subjective improvement, and in seven no result whatever was perceptible. In the first nine cases there was marked diuresis. The drug did not influence the blood-pressure materially, and on this point the author differs from Germain See, who placed Digitalis and Sparteine side by side.

He ascribes the diuretic action of the drug to stimulation by it of the renal epithelium. He found the drug to have a marked action upon the heart in relieving palpitation, pain and dyspnœa. In the majority of cases where relief was afforded there was no evidence of any controlling of the heart's action. He finds Sparteine most active when given shortly after a course of Digitalis. No symptoms of poisoning were observed.

The author thinks that Sparteine is indicated when diuresis is required, and will be principally useful in cases of cardiac disease with failing compensation. It is noteworthy that though Leo has administered the drug in doses a hundred times greater than those given by Voigt, yet he seems to have been less successful in his results.

Dr. J. Prior, Docent in Bonn, prompted by experiences of Germain See, has for some time past been using Sulphate of Sparteine as a heart remedy in general, but found it especially useful in affections of the cardiac muscles, be it either change of tissues or weakness ; further, also, in valvular troubles when the compensation was affected, and particularly when the pulse was irregular, jerky or arythmic. The author sums up the results of his observations with the drug in the following notes :

1. Sparteine increases the secretion of urine. This, in healthy patients and under certain circumstances, may take place without the circulation being materially affected.

2. Whether, according to the views of H. Leo, Sparteine owes its diuretic property to its effect on the epithelium of the kidneys or not has not yet been proved. It is, however, very possible that the effect the drug has on the heart's action increases the quantity of urine, as the author's experiments have proved to him beyond all doubt that Sparteine Sulphate materially affects the pressure of the blood.

3. It must also be mentioned that, although Sparteine had a beneficial effect on almost every heart trouble, yet in several cases it had no apparent effect whatever. It acted best when used in cases of irregular compensation, which resulted from valvular affections.

4. The drug usually commences to act in about two or three hours after it has been administered, and the effects last for a few hours, but in some cases even for as long as three days.

5. If the remedy has overcome the irregularity of compensation, it will keep the heart's action regular for some time, as is shown in notes 12 and 13.

6. In patients where the secretion of urine has been suppressed by the affection of the heart's action, the drug will perform the double duty of regulating the heart's action, and at the same time increase

the secretion of urine; the œdema and the serous transudations will also disappear.

7. The pulse frequency will be lessened, which is explained by the heart's action having been regulated, and the pressure of blood increases.

8. It will be well to mention that also in those cases where Sparteine has no apparent effect on the heart's action and has failed to regulate it, yet the pressure and difficulty in breathing were always relieved.

9. No beneficial effects were observed from the drug when used in cases of bronchial asthma.

10. On one occasion only were evil after-effects observed to follow its use, and that was after a dose of 2 grammes (31 grains). The pulse once became irregular. This was the only case when any disagreeable effects were noticed. Above all, the drug seems to have no injurious or irritating effect on the stomach or bowels.

11. Concerning the size of the dose which is necessary to insure the action of Sparteine, it was found that doses of 0.2 (about $\frac{1}{3}$ grain) per dose and $1\frac{1}{2}$ grains per die, which, by Voigt, are called "medium doses," were too small. A far better action was observed when, from the very outset, doses of 1 decigramme ($1\frac{1}{2}$ grains) were given, and in some peculiar cases even as much as 2 decigrammes ($3\frac{3}{4}$ grains) at a dose, and in a few special cases this dose was repeated several times during the day. In this respect the author agrees with Germain See and also with H. Leo, who both advise 1 dose ($1\frac{1}{2}$ grains) several times a day, and who ordered 2 or more grammes of Sparteine Sulphate to be taken in two or three days. Larger doses than this should, however, be used with the greatest possible caution, as it has been observed that when over a certain amount has been given the action of the drug was reversed, and caused a still greater irregularity of the heart's action than that which had existed before the drug was used. From this fact it was, however, seen that

12. This artificial irregularity ceases in eight to twelve hours, and the former state again supervenes; and now smaller doses of the drug may be given with the same effect as though the drug had never been used before. From this it may be justly inferred that

13. No accumulative effects of Sparteine need be feared.

The author considers the use of the drug indicated in all cases of heart trouble in which Digitalis, which is still the reigning cardiac remedy, has been tried without avail, or when, from some reason or other, its use is abstained from, or when it is desired to regulate the heart's action in the least possible time.

Furthermore, the use of Sparteine is of great value in stenocardiac

attacks. It will give relief and good results, even when the heart's action is seemingly unaffected by it.

Its diuretic action is also of great value. The author is still in doubt as to its accredited action in bronchial asthma, but, at any rate, it cannot be compared with other remedies which are used in that disease

Levascheff has undertaken a series of studies with the object of determining whether Sparteine acts on the contractions of the heart, and if so, in what manner that action is produced—whether it is diuretic, if it acts favorably in cases of insufficiency in the contractions of the heart, in renal dropsies, and in the dropsies produced by hepatic cirrhosis. Finally, he compares Sparteine to the other cardiac diuretic remedies. Professor Levascheff formulates his conclusions as follows:

First.—The Sulphate of Sparteine has incontestably the property of reinforcing and regulating the contractions of a feeble or arythmic heart, while at the same time slowing the pulse, if that should be accelerated.

Second.—Sparteine increases the blood-pressure, and causes the disappearance of symptoms of blood-stasis and œdema, thus acting favorably on diuresis. The respiratory movements, under the influence of this remedy, become slower and more regular.

Third.—Clinical studies have not yet determined a diuretic action for Sparteine, and it is not yet known as to whether it possesses any direct action on the renal epithelium.

Fourth.—Sparteine is less active than the other cardiac tonics—Digitalis, Adonis and Strophanthus.

Fifth.—In inveterate cases, where the heart-muscle shows symptoms of degeneration, or where œdema is very excessive, Sparteine is without effect, even although the other cardiac remedies may act in a more or less favorable manner.

Sixth.—Sparteine is indicated in recent cardiac affections, when compensation is but little disturbed and when the degeneration of the cardiac muscle is inconsiderable.

Seventh.—Sulphate of Sparteine has a decided and yet not transient action on the heart, but this action is too feeble to produce well-pronounced therapeutic effects.

Eighth.—Sparteine acts very rapidly, fifteen minutes being sufficient to produce its characteristic action.

Ninth.—Thanks to this rapidity of action, Sparteine has a certain value in cases of acute enfeeblement of the action of the heart, as is often observed in different infectious diseases.

Tenth.—Small quantities of Sparteine (three-fourths of a grain daily) produced a therapeutic effect, but pronounced and constant action is

not procured with doses smaller than from two to five grains daily. Larger doses do not produce more marked effects.

Eleventh.—The daily dose of Sulphate of Sparteine should be from three-fourths of a grain to five grains, taken in three or four doses.

Twelfth.—The inconveniences of Sparteine are irritation of the mucous membrane of the intestines, and, as a consequence, diarrhœa, vomiting and nausea.

Panniskie also reports the result of thirty-three observations of the clinical employment of Sparteine, and he summarizes his results as to the action of Sparteine on the heart as follows:

First.—In small doses, from one-third to one-half of a grain, or one to one and a half grains a day, it reinforces the action of the heart, the pulsations of the heart are slowed, the blood-pressure is increased, and the heart beats more regularly.

Second.—In moderate doses, one to one and one-third grains, given at one time, no influence on the heart is manifested.

Third.—Individual doses of from one to one and one-third to two grains, or up to fifteen grains a day, paralyze the heart, the pulse becomes slow, feeble, and the rhythm of the heart is disturbed. Small doses irritate the pneumogastric nerve, and large doses paralyze it. In all cases the action of Sparteine falls below that of Digitalis. Small doses increase the tonicity of the bloodvessels, this effect being evident thirty to forty minutes after its administration. No cumulative action was observed, and, contrary to the opinion of Leveschеff, Panniski has not found that it produces any gastric or intestinal troubles. Its diuretic power is feeble, and is manifested only in cases when there are organic troubles of the heart. According to Panniski, the indications for the therapeutic employment of Sparteine are as follows:

1. Nervous troubles of the heart.
2. In cases of painful and distressing sensations in valvular diseases of the heart.
3. At the commencement of Graves' disease.
4. In the asthmatic attacks of bronchitis and emphysematous subjects.
5. In cases where Digitalis is not supported.

SPIGELIA.

There are about thirty known species of Spigelia, natives of tropical and sub-tropical America. Spigelia Marylandica is indigenous to our Southern States; Spigelia anthelmia is a native of Jamaica and some other West Indian islands, Spigelia glabrata grows under the equator.

The more tropical the species, the more poisonous they are. They all cause similar symptoms, varying only in intensity, and there is no necessity for separating them. In the foreign markets the various species are mixed when sold. An American physician, Dr. Lining, wrote of it first, in 1754. He claimed to derive his knowledge of its uses from the aborigines. Then followed Drs. Garden, Chalmers, Barton, Ives, Thompson, Eberle, Dewees, Wright and others, all Americans. It was introduced into Europe and came to the knowledge of Hahnemann, who, with his rare intuition, foresaw its great and varied powers, which he illustrated by his heroic provings.

At first it was used solely as an anthelmintic, and even to this day is so used by many regular physicians. Dr. Wright first pointed out its narcotic properties, Barton reported cases of death from its employment, and Chapman attributed its efficacy as a vermifuge to its narcotic influence on the intestinal parasites. Ives explained that it first stupefied, then expelled the worms by its purgative influence. He compared the effects of the fresh root with those of Digitalis and Stramonium. "Like the former," he says, "it quiets general nervous irritation, and, like the latter, it causes dilatation of the pupils." But, when this was written, very little was really known of the real action of Digitalis. Ives says Spigelia causes a sort of mental derangement, with alternate fits of laughing and crying. Thompson took large doses of the root and found it produced acceleration of the pulse, flushed face, drowsiness and stiffness of the eyelids.

A case was reported in 1855 by Salisbury, in the *Boston Medical and Surgical Journal*, where an infusion of three drachms of the root, in three gills of boiling water, was ordered for a child, 4 years of age, to be taken in eight equal doses at intervals of two hours. After the third dose the skin became hot and dry, the pulse 110 and irregular, the face, especially about the eyes, including the lids, much swollen, and the pupils widely dilated. There were strabismus of the right eye and a wild staring expression, giving the countenance a very singular and, in fact, ludicrous appearance. Yet the intellect seemed unaffected. On attempting to assume the erect posture the patient was seized with general tremor, which passed off in a few seconds, and left her quite exhausted. The next morning all the alarming symptoms, with the tumefaction of the eyelids, had disappeared. Dewees declares it is harmless, and that he has never seen distressing symptoms from its use, but adds that it did, in a few cases, cause "slight squinting, with delirium." We should think these ominous symptoms were distressing enough.

The universal testimony of the old school as to its effect as a vermi-

fuge allows no doubt of its powers. When given in the doses they prescribe, it doubtless does narcotize the worms. But it is a singular fact relating to worm medicines that they often remove so-called "worm symptoms" when there are no worms. This is true of Cina, Granatum, Santonine, Chenopodium and others. Dr. Stille, one of the most acute of observers, alludes to these when writing of Spigelia. He says: "There is a state of intestinal derangement presenting all the symptoms of lumbricoid ascarides and which is most frequently observed among strumous, feeble and precocious children. They have fever, a dry, hot skin, furred tongue, tumid and confined bowels, capricious appetite and nervous irritability. These symptoms are often dissipated by Spigelia, without causing the discharge of any worms." An English physician recently asserts the same of Pomegranate bark.

Now, there are two explanations of this. 1. The worms may really exist, are killed by the drug, and are digested. Living worms are not affected by the gastric juices, but, dead, they are seized upon and treated like any piece of meat. 2. Provings of all the anthelmintics show them capable of causing all the so-called "worm symptoms." This they do by acting as irritants to the intestinal tract, and arousing reflex irritation as well as a direct irritant action on the brain and spinal cord. They are, therefore, all homœopathic to "worm symptoms," whether caused by parasites or other irritants in the intestinal canal.

Spigelia causes certain brain and heart symptoms, caused by no other drug, but even these are simulated by the irritant action of intestinal parasites. Notwithstanding the neurotic effects of Spigelia observed by their own school, the regulars have never applied this drug to other than worm affections. Hahnemann's provings and his use of it have always been a *terra incognita* to them. They have ignored its action on the eyes, the cranial nerves and the heart. In our school it is an invaluable remedy for certain neuroses affecting the head, eyes and heart. We have used it successfully in rheumatism, which is believed by many pathologists to be a neurotic disease. Hughes, in his Pharmacodynamics, has given such a concise yet clear resume of its curative sphere that I will not repeat it. In Allen's Encyclopedia of Materia Medica you can find all the symptoms of this potent drug. Fortunately, Hahnemann's provings were made with massive doses of the tincture, so that we cannot doubt their value. These, with the cases of poisoning above mentioned, have given us a good pathogenesis. Added to these, we have now some later and important knowledge of the power of this drug. It comes from Allopathic sources,

and I am sorry to say that, while our school seems to be neglecting heroic drugs and physiological experiments, the Allopaths are making rapid progress in that direction.

Dr. H. A. Hare, in the *Medical News*, of March 12th, 1887, gives us the following results of physiological experiments with Spigelia: "When as much as three ounces of the fluid extract of Spigelia are given by the stomach to a large dog, weighing forty pounds, the following symptoms appear: Almost immediately after the ingestion of the dose the animal has short and quick expiratory movements, amounting almost to a cough; soon after the pupils become widely dilated, and at the same time a very marked internal strabismus asserts itself, the eyes becoming fixed in this position, so that they cannot follow any object, such as a pencil, when it is passed from side to side. Constant retching, with no result, now comes on, the animal standing, and apparently suffering from no sensory or motor palsy. There is a change in gait soon after this marked exophthalmus develops itself. The retching, having lasted about five minutes, now passes off, and at this time signs of muscular weakness and lack of co-ordination appear; the walk becomes staggering in both fore and hind legs. The respirations now become very rapid, resembling those of a dog after a long, hot run; the tongue hangs from the mouth and is dry and red, and the nose is hot and no longer moist. Muscular power is progressively lost, so that the dog falls frequently when endeavoring to walk, but sensation does not seem to be affected. About this period the animal lies down and passes into deep sleep, which in time passes into coma, and death follows without any movements being made, evidently from a general failure of vital force. The respiration, as death approaches, becomes slow, and is finally extinguished consentaneously with cardiac arrest. In the frog the same symptoms occur as in the higher animal, including the marked exophthalmus and, to a less degree, the strabismus. The fixation of the eyeball is extreme, and it feels to the finger like a hard knob which the lid cannot cover. Muscular weakness, with dropping of the jaw, comes on, and motor power is constantly decreased, until the batrachian lies relaxed and powerless. That the action of the drug in thus destroying motor power is spinal was proved by the following experiments: If the hind legs are protected from the poison by ligation of the abdominal aorta, the palsy is as great as under ordinary circumstances, and reflexes are totally abolished. Further, if the spinal cord be directly galvanized, no movements occur in the hind legs; and, lastly, if Strychnina be injected into the body, even in large amount, its action is not only slight, but occurs after the lapse of many minutes. That the drug has no action

on the motor nerves is proved by the fact that, when the poison reaches the efferent nerves, either through the circulation or when directly implied, galvanization of the nerve-trunks causes normal contractions in the tributary muscles, and the sensory nerves likewise escape; for if the drug be applied directly to the nerve and the foot irritated, signs of pain are elicited, and reflex movements occur. Further than this, if the vein in the leg be tied and the drug injected into the limb, thus protecting the spinal cord, reflexes occur on irritation of the drugged foot. That the palsy is not cerebral is proved by the fact that movements of muscles supplied by the cranial nerve continue long after the movements in the legs have ceased, and by the other experiments already detailed. The action of the drug on the circulation is as marked as its effects on the nervous system, and on the cardiac muscle it acts as a direct depressant poison, for if it be injected into the jugular vein in such a way as to come suddenly in direct contact with the heart, the movements of that viscus almost instantly cease. Further than this, if the excited heart of the frog is dropped into a strong solution of the drug, its movements are almost immediately stopped in a condition of diastolic arrest, although the relaxation is not very marked.

"When a frog receives as much as twenty minims of the extract of Spigelia, the heart is slowed to a considerable extent—as much as ten or fifteen beats per minute—and diastole, while not increased in length, is nevertheless very full and marked. The change from systole to diastole is abnormally rapid, so that the heart in one moment in systole springs with a quick movement to its full diastolic condition. Systole, however, gradually increases on diastole, in much the same manner as in Digitalis poisoning, until finally the greater portion of the ventricle fails to dilate, the apex being tilted more and more forward, while the ventricular walls are powerfully contracted. As the systolic pauses increase, the diastolic movements decrease in volume, until finally the heart dilates no more than it does normally. At this time the powerful and heretofore spreading systolic contractions seem to lose power, and the heart shortly stops all movements in a semi-relaxed state.

"Experiments on the warm-blooded animals show that on the injection of one drachm or less of the drug, the action of the heart is very rapidly slowed in its movements; and that this slowing is chiefly due to central inhibitory stimulation is shown by the fact that, if the vagi be cut before the drug is given, this slowing does not occur, and also if, after the drug has slowed the heart, the vagi be cut, the inhibition no longer remains. That the fall of arterial pressure produced by this drug is due in great part to the cardiac depression which it

produces is proved, since asphyxia will cause a rise in pressure, and that the pressure returns nearly to normal as soon as the heart gets rid of the drug which has been suddenly injected into it. On the respiratory centre the drug seems to have a still more depressing influence, respiration ceasing some moments before the cardiac arrest."

Had Hahnemann lived until to-day, in the brilliant light of the scientific knowledge of this decade, he would have been gratified to see such experiments as this, confirming, as they do, his brilliant provings of Spigelia. I am sure, indeed, that he would have followed his provings of this drug on men and women with provings on animals. I am certain he would not have joined in the senseless opposition of some of our school to experiments on animals, and who assert that the symptoms so produced are no criteria to the effects of the drug on man. The above-quoted proving on the dog disproves such an assertion, for we get a true picture of the ultimate fatal effects, as well as the extreme effects before death, presenting the symptoms of Hahnemann's provings in an intensified form. Observe the following symptoms on the dog, and see if we have gained no new knowledge:

1. Quick expiratory movements, almost amounting to a cough.
2. Pupils widely dilated.
3. Spasmodic internal strabismus.
4. Exophthalmus.
5. Respirations very rapid and panting.
6. Loss of muscular power, but not sensation.
7. Deep sleep, which passes into coma.

Hahnemann has the following similar symptoms:

1. Eyes weak, with apparent internal impediment; wherever he turns them, they remain, etc.
2. Pupils dilated.
3. Eyes seem distended. (This is an incipient exophthalmus.)
4. Eyes seem too large for their orbits.

Some of the other symptoms are faintly given in Hahnemann's provings, but he could not carry the provings far enough to cause real strabismus or the actual exophthalmia. Even the cases of accidental poisoning of children did not go to this extent. In my studies of the action of Spigelia on the heart, I have often wondered why it has not been used in exophthalmus. It has all the necessary heart symptoms, but I cannot find any clinical cases reported where it has been used, nor is it recommended for exophthalmus. If Hahnemann had experimented on animals, this symptom, with all its concomitant conditions, would have been developed.

Dr. Harris' description of the movements of the heart of the frog is

graphic and interesting. When we read the heart symptoms in our provings side by side with it, we can better understand the manner in which the symptoms are produced. The conclusions to which we must arrive are these:

1. Spigelia acts directly on the heart as an irritant, causing valvular inflammation.

2. It acts on the brain and the central nervous supply of the heart, causing various neuroses, neuralgias and spasmodic movements.

3. It acts on the respiratory centres, causing paralysis, and this paralysis is so marked that the animal dies of arrest of respiration before the heart dies in diastole.

Spigelia can now be used more intelligently as a cardiac remedy, and its sphere is greatly enlarged. It has large possibilities as a cerebral remedy, as in congestion, inflammation, meningitis (basilar and cerebro-spinal).

It should be considered in chorea, spinal irritation, rheumatic irritation of the brain and spinal cord, and, lastly, for many reflex symptoms caused by worms and other forms of intestinal irritation.

SQUILLA MARATIMA.

Squilla has not yet been used by the Homœopathic or regular school in heart affections. At the time the original proving of Squilla was made, no method of testing its effects upon the heart was in use. But if a careful study of these provings be made, it will be seen how closely its chest and respiratory symptoms compare with the bronchial and pleuritic troubles which are so often present in mitral lesions. Owing to the imperfect supply of blood to the lungs in the mitral disease, the lungs—and especially the bronchial mucous membrane—become congested; this causes a profuse flow of mucous (bronchorrhœa) or acute bronchitis, also œdema and venous stasis of the lungs, and even pleuritic effusion. The cough in such cases closely resembles the cough of Squilla, namely, loose, rattling, constantly harassing day and night; sometimes loose, then dry, spasmodic, disturbing sleep; loose in the morning, dry in the evening. The expectoration is either glairy or bloody and is very difficult to raise, although a large quantity seems to be in the chest.

The allopathic abuse of this drug is fearful. They give it to "loosen the cough." They do not know that the bronchorrhœa which they cause is due to the congestion of the lungs and bronchial mucous membrane, depending on cardiac weakness and irregular action, and that many of the cases of so-called bronchitis and pneumonia in children

are made so by the toxic action of Squilla. If the patients did not vomit up most of the drug the mortality would be greater. The pathogenetic action of Squilla is not unlike Convallaria (all the *liliaceæ*, in large doses, are more or less cardiac poisons). The primary effect of large doses of Squilla is to cause increased force and more rapid contractions of the ventricles; the pulse is small and hard, wiry, then becomes irregular and very rapid, and finally ceases from tonic closure of the ventricles. During this time the pulmonary circulation is rendered imperfect, and there is present passive congestion. Hence the cough, mucus râles, bloody sputa, dyspnœa, pleuritic pains, profuse urine, etc. It is my conviction that nearly all the symptoms of the chest and urinary organs caused by Squilla are produced by the action of this drug on the heart, and, except in a small class of influenzas, it is only indicated in chest affections *when cardiac disorder is present.* Many of the cases diagnosticated as bronchitis, pneumonia and pleurisy in children are probably due to acute endocarditis, pericarditis, or chronic valvular diseases, which we now know are very common in early life. In acute cases, presenting the characteristic symptoms of Squilla, it should be given in minute doses (3d dilution), or the malady will be dangerously aggravated.

Per contra, in cases of cough, dyspnœa, bronchorrhœa and pleuritic affections of a neglected or chronic nature, when the symptoms often assume the character of the secondary symptoms of Squilla, namely, constant hawking, loose or dry cough, great oppression of breathing, movement and lying down aggravate—the face is pale and cold, hands and feet cold and blue, heart's action feeble, irregular, palpitating, but *always deficient in force*, urine scanty, red, painful and often bloody—this remedy will be found promptly curative in larger but not pathogenetic doses. I have found the 1st dilution, in doses of five drops every hour, or the 1st trituration, in grain doses, act with the happiest curative effect. In dropsy from valvular disease it should not be used empirically, but always selected by the *ensemble* of its symptoms.

Scillain, or Scillitin, is the active principle of Squilla. It is acrid and bitter, a glucoside. It is sometimes called Scillitoxin. It has not been used in practice to any extent, for in the doses in which the regular school would deem necessary it might be a dangerous agent, for it is far more irritant than Digitaline. When its properties have been better investigated, and it has been proven by persons who can record the cardiac symptoms by means of all the recent methods, we may be able to use it with great advantage in those cases of heart failure occurring during the progress of inflam-

matory affections of the lungs, especially in capillary bronchitis of children.

Squilla is as much an irritant to the kidneys and bladder as it is to the respiratory passages. It is doubtless capable of causing acute nephritis and all the phenomena of Bright's disease, hence it will be Homœopathic to cardiac disease, secondary to renal disease.

The urinary symptoms in the provings are striking, but owing to no analysis having been made we do not know the actual amount of disease cured.

STERCULIA ACUMINATA.

(Kola nut.)

Botany.—Kola is a species of the genus Sterculia of the sterculiaceæ; botanical name, *Sterculia Acuminata.* It grows in Africa, between Sierra Leone and Congo. It is a small tree, resembling somewhat the chestnut tree, and may attain from ten to twenty feet in height.

The fruit of the Kola (the nut) contains from ten to fifteen seeds, chestnut form, and of variable dimensions; these are red or white; the coloring matter is exclusively in the epidermis. The seeds easily separate into two halves, of rosy or white color. The substance is composed of cells, stuffed with large starch grains, resembling a potato on section. It is in these cells that are found the Caffeine and Theobromine.

The Kola tree bears its nuts when about ten years old. At this epoch a good-sized tree may produce twice a year eighty or ninety pounds of nuts. These are made much use of by the natives, who attribute to them divers medical properties. They are, for instance, properly used for their stimulant, sialagogue and stomachic effect. The Africans chew them much as the Brazilians do coca, and they ascribe to them quite as marvelous properties. In certain districts of Africa, visited by that daring traveler, Rene Caillie, he found Kola nuts so much prized by the natives as to be used for money. The white Kolas were regarded as valuable presents, *i. e.*, between a host and his guest. To send a person red Kolas, however, was regarded as an insult. Solemn oaths were, in fact, made on the Kola, which was treated as a sort of fetich. Its active principle is Caffeine. It also contains Theobromine and Tannin. The powdered nut contains two parts Caffeine.

" PHYSIOLOGICAL EFFECTS.

"It is used as coffee is, in infusion, by the natives of Africa. Among the physiological properties which we think may properly be ascribed to the infusion are the following:

"1. It produces insomnia.

"2. It is an aphrodisiac (Heckel & Schlogdenhauffen).

"3. Like coffee, it is an excitant of the intellect and of the imagination.

"4. It restrains tissue waste, being essentially an *aliment d'epargne.*

"We do not know by what mechanism Kola diminishes the combustion of the animal economy, without diminishing the vigor of the organism, but the fact is none the less patent. According to Keiss and Duval, principles of the order of Caffeine favor the transformation of heat into force, and enable the organism to use to better advantage the true alimentary substances previously ingested. We do not know whether this be the true explanation, or whether, according to Mongazza, they act simply by hyperexcitation of the nervous functions—whence the name which he applies to them—*nervous ailments.* It is certain that, although containing a small per cent. of nitrogen, they are not utilized as food, but traverse the organism without undergoing decomposition.

"It appears from careful observations of Dr. Monnet, of Paris, that Kola is diuretic. This might have been anticipated, from the fact that Caffeine is diuretic. Moreover, there are the same energizing of the heart's action and increase of vascular tension which attend the use of Caffeine. Yet, while the effects of these are so near alike, Dr. Monnet is inclined to think that Kola is the more energetic of the two, and that its effects in raising the blood-pressure and regulating the cardiac pulsations are decidedly more pronounced than those of Caffeine. In a little book published by Dr. Monnet last year are recorded numerous physiological experiments made by him to determine the action of Kola on the vascular system. He there showed by sphygmographic tracings that in both cold-blooded and warm-blooded animals subcutaneous injections of a certain number of cubic centimetres of an infusion of twenty grammes of Kola in twenty grammes of water raise the vascular tension—with, however, this difference, that in frogs this increase of temperature is accompanied by slowing of the heart's action, while in warm-blooded animals (dogs) there is an augmented rapidity of the pulsations. But augmentation of tension and acceleration of the heart's beat seem to be antagonistic phenomena, as the law of Marey affirms. This eminent physiologist has laid down the principle that the faster the heart beats the less resistance it meets in emptying itself; in other words, the heart slows its action when there is any augmentation of tension. In the frog this law finds verification; in dogs it has, in my experience, yet to be verified. This law, to do justice the principles which it enumerates, is a law made in virtue of immut-

able physical principles, but which takes no account of the nervous system and its influence, which are almost nil in the frog, but much more considerable in the dog, and greater still in man. These conditions, then, of excitability of the heart of the warm-blooded animals do not allow us rigorously to accept Marey's law, and the contradictions of my experience are more apparent than real."

In addition to these valuable physiological experiments we need a series of provings to elicit guiding symptoms. Unless we have these we cannot select it with accuracy, or differentiate it from Digitalis, Convallaria, Adonis or Caffeine. Kola has not been used extensively as a medicine, but the Allopathic school of France—namely, Drs. Cunio, Durian, Dujardin Beaumetz and Monnet—have used it empirically with good results.

Dr. Monnet, in summing up the properties of Kola, arrives at the following conclusions:

"1. Kola, by the Caffeine and Theobromine which it contains, is a tonic of the heart, whose pulsations it accelerates, while it increases their power and regulates their contractions.

"2. In the second phase of its action it becomes, like Digitalis, a regulator to the pulse, whose energy it raises; under its influence the pulsations become more ample and less numerous.

"3. As a result of its effect on the vascular tension, diuresis augments, and this fact renders it valuable in affections of the heart with dropsy.

"4. It seems to result from my observations that Kola, while energizing the cardiac contractions and promoting the contractility of the muscles of organic life, has, nevertheless, a paralyzing influence on the striped muscles when employed in toxic doses.

"5. It is a waste restrainer, diminishing the losses of the economy from the combustion of the agatized compounds—probably from a special action on the nervous system.

"6. It is a powerful tonic by the principles which it contains, and its employment is indicated by anæmias, in chronic affections of debilitating character, and in convalescence from grave fevers.

"7. It favors digestion, probably by augmenting the secretion of gastric juice (aupeptic influence), and by acting on the unstriped muscles of the stomach, which it tonifies. Under its influence anorexia disappears, and the digestive functions become more regular.

"8. Lastly, it is an antidiarrhœic medicament of great value, and as such has rendered good service in chronic diarrhœa, and in certain cases of sporadic cholera, although its action in these instances may not as yet be clearly explained."

This last-mentioned property is possessed in a large degree by another drug which is used by the natives of South America in a manner similar to Coffee and Kola, namely, Guarana. Our school has found Guarana useful in diarrhœa due to deficient digestion and faulty assimilation. I expect it will be of great value in two classes of cases, namely: 1. Patients with organic or functional diseases of the heart—with feeble circulation—anæmia from loss of appetite—with faulty digestion and assimilation, with a tendency to dropsy. 2. In children—feeble from improper food—with loose, undigested stools—nervous erethism—and poor circulation and defective elimination of morbid secretions.

Dr. Monnet records two cases of "Cephalalgia, due to circulatory disturbances," cured promptly by Kola. He doubtless means those varieties of megrim now called "spastic," when the intense pain coincides with cold, pale face and cold extremities. I believe it will prove as useful as Guarana in nervous sick-headache, just the opposite of those we cure with Sanguinarin, which has hot face, throbbing arteries, etc.

It appears to me that Kola has some resemblance to coca, for it is used as a remedy against fatigue, and to enable the natives to endure great physical exertion. In wasting diseases and the convalescence offices it ought to prove a valuable aid to other restorative remedies.

Dose—French physicians use one teaspoonful of the tincture, frequently repeated, in severe cases. The tincture is made by adding one oz. of pulverized Kola nuts, five ozs. of alcohol (at 60 degrees), macerate fourteen days, and filter. Doubtless the lower dilutions and triturations will be potent enough except in grave cases of heart-failure.

NOTE.—Since the above was written, I have had ample opportunity of testing the value of Kola in functional heart disturbances. It acts admirably as a regulator of arythmical action, especially when the cardiac disturbance is due to gastric irritation. In *chronic diarrhœa* of children and adults, with undigested stools, etc., it has acted admirably.

STIGMATA MAIDIS.

Corn-silk was first introduced and used as a sedative remedy in irritable conditions of the whole urinary tract. It was considered as an analogue of Triticum repens, but was soon found to have a wider sphere of action. Not only is it one of the most potent remedies in irritable conditions of the ureters, bladder and urethra, but it is a powerful diuretic in renal disorders, unconnected with cardiac derangements. Still later, a French investigator, Dr. H. Dupont, has studied its action on the heart, and thus sums up the results:

1. It renders the heart's action slower and stronger.
2. It regulates the rhythm.
3. The diuretic action is almost always manifested the very first, and goes on increasing up to the thirteenth or fourteenth day.
4. In cardiac affections, with œdema of the lower limbs and general dropsy, this beneficial action is the most prompt and most evident.
5. While the dropsy diminishes, and often disappears, the arterial tension increases and the venous tension is reduced concurrently; the general condition becomes decidedly improved, and, in particular, the author mentions a subjective feeling of calmness and *bien être*, except that there is pronounced dyspnœa, which it does not remove. (Convallaria has the same effect and also removes the dyspnœa.) In hypertrophy and stenosis Stigmata maidis always produces good results. The author thinks it acts more powerfully than Digitalis and with about the same energy as Convallaria, but that it is to be preferred because it never produces unpleasant effects. When I read Dr. Dupont's report I could hardly believe that the Corn-silk, so apparently inert, tasteless and simple, could be capable of such profound influence, but I have verified the truth of his assertions in several cases. Dr. H. uses an "extract;" he does not give the formula. I have found the fluid extract, in doses of twenty to forty drops, three or four times a day, to be effectual.

Dr. W. H. Burt reports a cure of symptoms simulating *angina pectoris* by means of this remedy.

Dr. Crull (*Therap. Gazette*) writes: "In organic heart disease, when there is deficiency of urine, it will act as a mild but certain diuretic, increasing the flow of urine when stimulating diuretics have failed. The fluid extract of Corn-silk given in drachm doses, alternated with fifteen drop doses of Cereus bonplanti, I consider two most excellent remedies and palliatives in functional and organic diseases of the heart."

This same writer admits that he has seen considerable irritation of the bladder and kidneys arise from such doses of Corn-silk long continued. It is probable that experiments on the healthy, if carried far enough, would show that it was capable of causing severe and chronic lesions in the kidneys.

STROPHANTHUS AND STROPHANTHIN.

Effects.—The action of these preparations on the heart, as hitherto observed, is said to be an exceedingly beneficial one. A constant and rapid subsidence of an excited pulse is brought about within a few

minutes; and neither the digestive troubles nor the cumulative effects so often consequent upon Digitaline medication have been observed, even after several weeks' use of the Strophanthus preparations.

Discovery.—Medical science is indebted to Professor Fraser for the first accounts, given in the year 1871, of Strophanthus, and of the toxic principle contained in the seeds of this plant.

History.—Two years later, "Just's Botanic Annual" published a more detailed description of the plant. According to it, Strophanthus is an exogenous creeper, belonging to the Apocyneæ, climbing the highest trees, and indigenous to the valley and mountain forests situated above the Victoria Falls of the Zambesi.

Description.—The fruit of the plant ripens in June. It is a pod, growing up to twelve inches in length, composed of a rough external and a somewhat leathery internal shell, containing as many as 200 seeds. The seeds are about fifteen to twenty millimetres long, four millimetres broad, and one millimetre thick. At one end they taper off to a fine point, culminating in a stalk nearly nine centimetres long, of a silky gloss, delicate and brittle, and protrude on all sides in the shape of a sprinkling whisk. At their base the seeds are obtuse, of a yellowish-white color, and covered with a layer of soft, silky and closely adherent hair. At present, there are two kinds of these seeds in the market, a greenish-brown and a white variety. The former, said to be the fruit of Strophanthus hispidus, was defined as Kombe seed (parent plant, Strophanthus Kombe, Oliver) by Professor Oliver, of Kew. The question of the identity of these seeds does not appear, however, to be definitely settled as yet; and the possibility is therefore not excluded that the white variety are the Kombe seeds, from which the natives prepare the Kombe poison.

The seeds contain, besides fixed oils and albumen, that intensive poison which, by the name of Kombe Inee, or Onage, has been used for a long time in West and Central Africa for poisoning arrow-heads.

A green tincture, containing the active principle in solution, may be extracted from the seeds by means of strong alcohol. If, previous to this, the fixed oil of the seeds be extracted by ether, this ethereal solution will likewise contain a certain percentage of Strophanthin; and to this fact, in part, the slight efficacy of the commercial alcoholic tincture of Strophanthus is attributed. The Strophanthin produced by me from Strophanthus seed is a white crystalline powder, melting at about 185° C., evaporating without residue, and showing very intensively the reactions of Elborn and Helbing.

Both Strophanthus tincture and Strophanthin are employed in medicine. The tincture is of a pale yellow color, has a peculiar penetrating

odor, and a persistent, bitter taste; the dose is of 5, 10, up to 20 drops, twice a day, to be taken either pure or in Aqua Laurocerasi. The single dose of Strophanthin is placed by British physicians at .0003 grammes. In the Vienna Imperial Public Hospital, it is used to the extent of one to two milligrammes per diem, ordinarily dissolved in Aqua Laurocerasi, and given a drop at a time.

A little more than a year ago, Professor Fraser, of Edinburgh, published the result of fifteen years' experience with a drug till then all but unknown to the medical profession. The feeling of respect due to such an accurate observer and careful experimenter as Fraser, the experience of several of our New York associates, as well as the comparatively recent facts brought to my notice in our own community, are the reasons of my calling your attention, this evening, to the use of Strophanthus in diseases of the heart.

In the *British Medical Journal* of November 14th, 1885, one may find the full account of Fraser's experiments; and I will, therefore, only call your attention to a few of the most important characteristics of the drug, hoping thus to induce you to give it a careful trial in your own practice, if you have not already done so.

The plant is indigenous to Africa, and is used by the natives as a poison for arrow-heads. It is of the Digitalis group, and has a distinct action upon striped muscular fibre, and also upon the heart, and, in poisonous doses, causes greatly increased and almost continuous cardiac systole, with consequent paralysis of the heart and early cadaveric rigidity. By a series of experiments, patiently carried out over a number of years, both clinically and in the laboratory, Fraser has arrived at the following conclusions:

First.—That Strophanthus has a distinct action, like Digitalis, in increasing the force of systole, at the same time diminishing the rapidity of the heart's action; whether by stimulation of the organ or direct action upon the heart's muscle he is not prepared to say.

Second.—That it has little or no effect upon the bloodvessels, and, therefore, causes less blood-tension than Digitalis, which, either by vaso-motor influence or direct action, or both, causes a contraction of the vessels, with a consequent rise of blood-tension.

Third.—That it causes less gastro-intestinal disturbance than Digitalis.

Fourth.—That it possesses, like Digitalis, both antipyretic and diuretic properties.

Fifth.—That, unlike Digitalis, it is not cumulative in its effects; and

Sixth.—That it may be used in smaller doses than Digitalis.

If Fraser's conclusions prove true in practice, we find a decided

weight in the balance in favor of Strophanthus; and, although experience teaches us to be cautious in accepting the much vaunted virtues of any new remedy, yet the facts brought to our notice by one of such eminence should make us unhesitatingly experiment for ourselves.

Fraser has used Strophanthus in the form of a tincture, in doses varying from three to twenty minims, twice or three times daily; but, in a recent article, he speaks of the dose as varying from five to ten minims. He has also experimented most successfully with the subcutaneous injection of the active principle, Strophanthin, a glucoside, in doses of $\frac{1}{50}$ of a grain, and by this means has noticed much more lasting effects from one dose than with the tincture. In one case, with severe symptoms from mitral regurgitation, the marked beneficial effect upon the heart's action by a single subcutaneous injection of $\frac{1}{50}$ of a grain of Strophanthin was noticed for eight days.

In the *New York Medical Record* of December 18th, 1886, among the "Transactions of the Practitioners' Society of New York" are reports of cases by Dr. C. L. Dana, the only ones yet made public, so far as I know, in America. Dr. Dana's results, in a comparatively small number of cases, are such as to make him believe that Strophanthus, as now used here, is a valuable addition to our pharmacopœia, and can be often used in cases where Digitalis is not so efficacious. The testimony of other observers seems to point towards the favorable action of Strophanthus, some believing that, eventually, it will supersede Digitalis in the treatment of heart disease. My attention was especially called to the drug by a well-known lady physician, of this city, who is enthusiastic over its action in her own case, and has kindly allowed me to quote her experience with it.

During the previous year this lady, a sufferer from mitral lesion, was very ill, in the South of France, with pneumonia, during the progress of which the heart became very troublesome. At the suggestion of her physician, during her convalescence she began taking Strophanthus, and, before twenty-four hours had passed, experienced the greatest relief from the breathlessness upon the least exertion, which had been one of her most distressing symptoms. The improvement continued steadily, until, by the advice of a physician in another part of France, she ceased to take Strophanthus, when the former symptoms returned. Repeated experiments have shown her conclusively that the drug gives her great relief from dyspnœa, and its effects are always more pleasant than those of Digitalis. In the use of the latter she had always experienced a depressing effect, coupled with gastric disturbance; with Strophanthus, however, the effect is always rather

exhilarating, and it has never caused the slightest trouble with the digestion. Its action is always markedly diuretic, and although she has never taken it in doses sufficiently large to carry the pulse below the normal rate, it has always had a distinctly calming effect upon the heart.

She continues to use the drug, omitting it at times for a few days, and always experiences the same sensations upon resuming it again. Her testimony, therefore, is distinctly in favor of Strophanthus as a substitute for Digitalis.

Acting upon these suggestions, I was fortunately able to try the drug in a case of severe heart disease, transferred to me by Dr. F. J. Knight, in which a slight mitral systolic murmur, great dilatation of the left ventricle, pulmonary œdema, a very rapid, irregular, intermittent pulse and almost constant orthopnœa were the chief symptoms. For several weeks almost constant use of the tincture of Digitalis and trials of Sparteine and Caffeine had failed to effect the action of the heart-muscle, the pulse varying from 140 to 110 to the minute most of the time. Tincture of Strophanthus, in doses of about three or four minims three or four times a day, was tried; but, owing to some rather obscure symptoms which I then thought might arise from the drug, it was discontinued after the third or fourth day; and although the patient insisted that she liked the medicine and that she breathed more freely, I noticed no special action upon the heart or pulse.

Soon after this the patient developed signs of congestion in the lower part of the left lung, namely, dulness and slightly bronchial breathing; râles from rapidly increasing pulmonary œdema were heard on both sides; the legs, arms and face were swollen, the dilatation of the heart increased, and relief from great dyspnœa was obtained only by subcutaneous injections of morphine.

The husband of the patient having heard that Dr. M. L. Chamberlain, of this city, had had experience with Strophanthus, suggested a consultation, to which I gladly assented, and at his advice the Strophanthus was again tried and gradually pushed. It was given finally in doses from fifteen to twenty-three drops by the ordinary glass dropper (about equivalent to ten or twelve minims) three or four times in the twenty-four hours; Digitaline, in doses varying from gr. $\frac{1}{100}$ to gr. $\frac{1}{75}$, being given between the doses of Strophanthus when the patient was awake. It would be quite unfair to attribute all the gain which immediately followed to Strophanthus, for, although Digitalis as used before in the tincture had not had the slightest apparent effect upon the pulse, yet the use of Digitaline naturally makes it impossible to say which was the larger factor in the improved condition of the

patient, but the following facts were noticed: rapid decrease of the dulness and bronchial breathing over the congested portion of the left lung, great diminution in the number of râles throughout the chest; the swelling of the arms and legs diminished; the dyspnœa was less marked; the action of the heart became much less feeble, while the pulse slowly dropped from 120 to 88, became perfectly regular and lost its intermittent character. This improvement continued for about a week, when a curious friction sound appeared near the angle of the left scapula, the exact nature of which it was impossible to determine, and that night the patient, while sitting up during a movement from the bowels, suddenly fell back and expired. No autopsy was allowed.

Synopsis of Case.—Patient suffering intensely in the last stages of mitral disease, after receiving no apparent benefit from the tincture of Digitalis, Sparteine or Caffeine, obtains very great relief from somewhat large doses of tincture of Strophanthus alternating with Digitaline. Another case in which I have noticed a markedly beneficial effect from Strophanthus is a lady, 63 years of age, for years a sufferer from valvular disease, in which dyspnœa and great irregularity of the heart's action are the chief symptoms. During a severe illness last November, from which I never expected her to recover, all the most serious symptoms were greatly relieved by three or four minims of Strophanthus, given three times a day. General œdema of the legs disappeared; the action of the heart and pulse steadily improved, and the latter, which by the use of Digitalis had fallen to about 45, rose again to about 60, and although occasionally intermittent was more regular than I had ever known it under the previous use of Digitalis. The patient is now vastly improved in health, moves about the house, is able to go out to drive or walk, and still takes about three minims of the Strophanthus three times a day, and although the pulse still intermits and is somewhat irregular, the action of the heart is much less tumultuous than before, and varies from 60 to 80 beats in the minute. The last case in which I have used the drug is a man about 58 years of age who has had symptoms which point to fatty degeneration of the heart, namely, a weak, rather irregular and rapid pulse, with occasional attacks of faintness. This patient seems not at all sensitive to the drug, and I have gradually increased the dose to fifteen minims four times in the twenty-four hours. Although the pulse has never fallen below 86 and usually is about 94 or 96 to the minute, it is now of very good strength, and perfectly regular since he began to take the tincture about five or six weeks ago. Previously the pulse had often been about 100, and at times very weak. The general condition has slowly improved; there has been no recurrence of the attacks of faintness; and

as the patient tells me he has always had a rapid pulse, I have not attempted to reduce its action further, and am at present diminishing the dose again to see how far the drug has a controlling action upon his heart.

Dr. J. Lindsay Porteous concludes an article on the use of Strophanthus as follows: "It decidedly increases the flow of urine; it causes a certain amount of moisture over the surface of the body; it relaxes the bowels; it markedly makes the pulse stronger, although it may raise it for a short time after it is taken. If carefully used, it is destined to hold a foremost place among remedies for controlling the heart's action, but, like other remedies, will not suit every patient."

J. Higham Hill, M.D., gives the case of Dr. R., who had for many years been the subject of mitral regurgitant disease of the heart. There was considerable œdema, extending to the upper part of the thighs, scrotum, etc. He had twice been aspirated during the last few months for hydrothorax of the right pleura, a large quantity of fluid being withdrawn each time. He had also suffered greatly from very painful and intractable flatulent distension of the abdomen, arising apparently from atonic dyspepsia. Strophanthus was given in doses of five minims of the tincture three times a day in half an ounce of water. Improvement rapidly followed; the pulse on the second day fell from 96 to 80 and became much fuller and stronger; the renal secretion increased on the third day from thirty ozs. to eighty ozs., and the œdema rapidly decreased.

Dr. S. C. Cherr, after giving in detail a case of cardiac dropsy which terminated fatally, concludes as follows: "Since my first use of Strophanthus in this case I have employed it in others similar in character. I have also used it as a cardiac tonic in other cases of weak heart, without valvular or other discoverable organic disease. In one case of double pneumonia, now convalescent, in which there was great danger from extreme feebleness and intermittence of the heart, it has been manifestly beneficial. Indeed, it has seemed to me to produce some good effect always in such conditions in the way of increasing the contractile powers of the heart. But in no case has its efficacy been more conspicuous than it was in the one I have reported, in which, nevertheless, the amount of disease was necessarily fatal. That any response to a medicine should have been made under such circumstances, or any improvement have occurred, was remarkable; and yet, over and over again, in this advanced stage of disease, the most unmistakable benefit was wrought by the Strophanthus."

Dr. J. Hutchinson, Glasgow, has used Strophanthus with good results in cases in which the prominent symptoms were cough, dyspnœa, pal-

pitation and œdema of feet and legs. In seven cases the palpitation seemed to be dependent upon dyspepsia; remedies were given for that condition; Strophanthus was also used in the hope of its exerting a calming and steadying influence upon the heart, which in all of them it succeeded in doing. The dose is from one to ten minims of the ($\frac{1}{20}$) tincture, equal to one of the $\frac{1}{20}$ grain to two of the $\frac{1}{4}$ grain McK. 8 R. granules. The therapeutical and physiological effects of Strophanthus were brought before the notice of the K. K. Gesellschaft der Aerzte of Vienna, on April 29th, by Professor Drasche. He reports that in his hands, and in those of Professor Bamberger, it had fully satisfied the expectations raised regarding it, and that it was already finding its way among the private practitioners of the Austrian capital. He had not hitherto used the full dose recommended by Fraser, in fact only the half of it, but in future he would give the quantity prescribed by its introducer. The pulse-rate invariably fell after its administration —sometimes in a few minutes, sometimes in the course of half an hour— and continued slower for several hours. In a typhoid case the pulse was kept at 52 for fully eight days. One patient complained of muscular weakness after a dose, so that she could scarcely sit up. In the case of a nervous patient, with a pulse of 140 to 150, ten minims, three times a day, reduced the rate to 120 beats. This action was still constant, and it took place almost immediately. In a case of Basedow's (Gravis) disease with tumultuous cardiac action, twenty drops of the tincture effected improvement, and the arythmia present was also somewhat improved. He had treated thirty cases of actual disease of the heart with the drug, and he must confess that he was quite contented with its action. Exaggerated cardiac action was reduced more quickly and surely than by either Digitalis or Adonis.

Professor Drasche (*Wien Med. Blatter*, 1887, page 586) found five drops of the tincture of Strophanthus given to the healthy man would produce in about three hours a fall of from about 8 to 12 beats per minute of the pulse, which would last part of the day. After ten drops the pulse fell in half an hour 12 to 20 beats; after twenty drops the pulse sank, in the single case given, from 84 to 54 strokes. There was no influence on the respiration, but a lowering of the temperature; in some cases as much as a degree. Fifteen drops given hypodermically caused great irritation and pain and swelling at the place of injection, violent headache, repeated vomiting and nausea and copious secretion of urine; the pulse fell in an hour from 96 to 84, and the next day the headache and general ill feeling continued, with a pronounced local irritation. In a strong 45-year-old man, suffering from left-sided pneumonia, four doses a day of five drops of tincture of

Strophanthus were followed in twenty-four hours by a fall of the pulse 18 beats per minute, and by a distinct slowing of the respiration and reduction of the temperature 0.8° C. The pneumonia itself was not affected, and the crisis came on the ninth day. In another similar case, under the influence of the Strophanthus, the pulse fell from 128 to 88 beats. In acute phthisis the remedy acted very promptly; there was high fever, with the pulse ranging from 140 to 152; five minutes after the exhibition of ten drops the pulse fell 20 beats, and two hours later 40 beats, while the temperature had gone down between one and two degrees, and the distressing cardiac palpitation was relieved. The rapidity of the action of Strophanthus showed itself also in a case of gastro-duodenal icterus. In twenty minutes after the use of twenty drops the pulse had fallen from 72 to 60, and the blood-pressure, as measured in a temporal artery, had increased ten per cent. According to Professor Drasche, forty to fifty drops a day must be considered as the maximum dose of the tincture. Under sixty drops a day, in an experimental case, the pulse became exceedingly small, weak and irregular. In a case of vaso-motor neurasthenia, with a great rapidity of the pulse, the continued use of the medicine was kept up, with interruptions, until 600 drops of the tincture had been taken without the production of any evidences of cumulative action.

Professor Drasche has also used the remedy in a number of cases of heart disease. In one case a 36-year-old patient with fatty heart and very pronounced cardiac symptoms, ten drops of Strophanthus tincture produced great relief of palpitations and of the dyspnœa. One hundred and sixty drops were taken in the course of five days without the slightest evil influence. In a second very advanced case, in which there were dropsy, very pronounced dyspnœa and very irregular pulse (120), in which Digitalis had failed, five drops of the tincture every two hours, until thirty drops had been taken, caused the pulse to fall to 108 without becoming more regular, but shortly afterwards the patient fell into a stupor and four days later died. In another similar case, forty drops of the tincture a day were followed by marked fall of the pulse and increase of the urine. Strophanthin was later given in solution, the four doses each day amounting to two milligrammes. The pulse became very irregular, varying from 36 to 60 beats every minute. There were marked increase in urinary secretion and great lessening of the dyspnœa. In a case of aortic insufficiency, which came into the hospital almost moribund, with the pulse 96, scarcely to be felt, fifteen drops in an hour caused the pulse to fall to 72 and become much stronger, and the patient slept through the night, for the first in three months. Afterwards forty drops of Strophanthus tincture being

given daily, the pulse fell to 60; but the patient complained of so much burning in the œsophagus and stomach with nausea that the medicine was withdrawn and Digitalis substituted. It, however, failed to have influence, and the man shortly afterwards died suddenly. In a second case of aortic insufficiency, the tincture of Strophanthus was given for four weeks regularly, forty drops a day, with great relief to the dyspnœa. Besides these cases, Dr. Drasche reports several others in which the Strophanthus tincture produced results similar to those that have been just described. The effect upon the excretion of urine seems to have been most extraordinary. In some instances the amount excreted after the administration of the drug was five, or even six times what it had been before. Almost universally when the Strophanthus was pushed the patient complained of burning in the œsophagus and stomach, with loss of appetite and extreme gastric distress, which not rarely rose to vomiting; sometimes there was diarrhœa. In no case was there any evidence whatever of cumulative action. The action of the drug is not only more prompt in coming on, but is evidently less permanent than is that of Digitalis. Dr. Drasche also tried using the remedy in cases of mitral insufficiency; here the effect of the remedy was often more marked than in cases of aortic disease. In one old case, with bloody sputum and other very severe symptoms, twenty-five drops a day of the Strophanthus tincture had so favorable a result that on the eighth day the patient left the hospital. In a case of mitral stenosis, with very severe symptoms and great cyanosis, after a second dose of forty-five drops of the tincture, the pulse fell from 88 to 44 per minute, and the respiration from 36 to 18, the dyspnœa disappeared, and the heart's action became not only stronger, but less irregular. Under the continued use of the remedy the pulse became strong at the rate of 44 beats, the respiration 16, and the urine enormously increased. This patient took in all 360 drops of the tincture without any untoward symptoms, but with the most favorable results, the patient leaving the hospital greatly relieved. Other cases of mitral diseases were affected similarly. As the result of his observations, Professor Drasche thinks that while we must consider Digitalis to act more as a tonic agent upon the heart, Strophanthus must be looked upon rather as a cardiac stimulant. He is also particular in cautioning a physician to see that the preparation used is genuine and pure. Strophanthin he believes to fully represent the tincture. As a diuretic, he gives the daily dose of Strophanthus as three milligrammes, and, for reasons which we have already laid before our readers, condemns its use hypodermically.

Mr. Zerner and Loerr (*Wiener Medizinisch Wochenschrift*, Nos. 36

to 40, 1887) have recorded the results obtained in the service of Professor Bamberger, of Vienna, in using Strophanthus in cardiac affections.

They affirm that it is equal in efficacy to Digitalis, and that they have only seen it fail when the degeneration of the heart-muscle has gone to the last degree. The indications and contra-indications for its use, they think, are identical with those controlling the employment of Digitalis. In one mild case of Basedow's disease the pulse, which at the moment of administration was 100, half an hour later had fallen to 88; half an hour after this it was 84, but four hours later it had regained its original frequency. In seven out of eleven cases of Bright's disease they achieved very good results from its administration. It is especially indicated when there are evidences of secondary failure of the heart in renal disease. In several healthy subjects no diuretic action at all followed the use of Strophanthus. This, if it be confirmed, proves that the diuretic action of the drug in disease is dependent, not upon any influence upon the secreting structure of the kidney, but is the result of the increased blood-supply to the organ.

Zerner and Loerr also confirm the statements of Drasche, that in large doses the remedy produces nausea and vomiting.

Dr. William Budd reports in the *Lancet*, September 10th, 1887, two cases of mitral cardiac disease, with albuminuria and excessive and other very severe symptoms, in which Strophanthus was entirely successful after the failure of Digitalis. The effect of the drug upon the secretion of the urine was extraordinary. He used five minims of the tincture three times a day.

A new use for this remedy, which, more than its properties as a cardiac tonic, will serve to render it popular, is its employment as a diuretic in renal colic. Dr. Hutchinson reports, in the *Provincial Medical Journal*, October 1st, 1887, a case of marked uric acid diathesis occurring in a man, aged 52, who, since 20 years of age, had been subject to periodical attacks of gravel. When Dr. Hutchinson was called to see the case the patient was then suffering from a violent attack of colic from the passage of a calculus through the ureter. There were severe lumbar pains, scanty urine and difficulty in micturition. At the onset of the attack the urine was high-colored, was then smoky, and finally contained blood. The bowels were confined; there was no nausea, but total anorexia. Dr. Hutchinson ordered him turpentine stupes across the loins, plenty of fluid to drink, a seidlitz powder in the morning and a tincture of Strophanthus in five-minim doses three times a day. The result of this treatment was to produce copious diuresis and a rapid relief of the pain.

In the absence of any officinal standard the tincture of Strophanthus, as sold in various drug stores, must vary in strength, and the important question as to the proper dose to be employed must remain unsettled. The only recourse that the practitioner has, who does not know exactly the method in which the tincture that he is using has been prepared, is to commence with a minimum dose and increase until the effects are obtained. The tincture should be prepared according to the method of Professor Fraser, as given in the first volume of the *British Medical Journal* for this year. The dose of this tincture may be set down as five drops, carefully increased if necessary.

Dr. Hochhaus thus summarizes his observations of the effects of tincture of Strophanthus:

1. For a valvular weakness in the stage of compensation disturbance, tincture of Strophanthus is an excellent remedy in certain cases, to retard, strengthen and regulate the cardiac action. The retardation occurs first, while the regulating effect only takes place, as a rule, after a few days. Dyspnœa and œdema are promptly relieved. But the favorable effects, in about one-half the cases, do not appear with the regularity and safety peculiar to Digitalis; and in most cases in which Strophanthus failed, Digitalis was effective. Digitalis has, generally, a quicker and more thorough effect, especially in causing diuresis, while Strophanthus affects a disturbed respiration far more favorably. It is more difficult to indicate Strophanthus than Digitalis in cases of valvular weakness, so that it is almost impossible to say beforehand in what cases Strophanthus will be successful.

2. In chronic degenerations of the cardiac muscle, with usually a small, frequent and irregular pulse, great difficulty in breathing and œdemas, tincture of Strophanthus may be relied upon.

3. In acute and chronic nephritis the effect of Strophanthus is not so marked as in the above-mentioned affections. The dyspnœa often yields to its influence as in the other diseases, but the diuresis and œdemas are not favorably affected by it.

4. In cases of palpitation and apnœa of nervous origin, Strophanthus often gives marked relief.

5. Œdemas of a cachectic character may be also favorably affected by tincture of Strophanthus.

6. In some cases the drug has secondary effects on the digestive track, causing a loathing of food, followed by choking and vomiting after eating, and sometimes by severe diarrhœa. But, as a rule, the aversion to food is the only disturbance, and this passes off when the stomach becomes used to the drug.

7. Hochhaus advises to begin with doses of gtt. vj i. d., in a table-

spoonful of water or wine, and to add gtt. ij daily to the dose until the effect is obtained, though it is not advisable to give more than gtt. xx t. i. d. Gtt. iij t. i. d. is the proper dose to begin with for children, but the dose should not exceed gtt. v t. i. d.

8. The effect usually appears on the second or third day, and generally lasts a week or two weeks, though there is considerable variation. Hochhaus has never seen a cumulative effect, even after long use of the drug.

9. While Strophanthus cannot lay just claim to all the praise bestowed upon it, it is valuable as an occasional substitute or an ally of Digitalis.

While on the subject of Strophanthus, it may be stated that further investigations have been made on Onabaine, the African arrow-poison principle which was recently alluded to in this correspondence. The substance having proved to be of nearly the same chemical composition as Strophanthin, also a glucoside, Dr. E. Gley has undertaken to compare the physiological effects of the two poisons, and found them to be also very similar. Both act upon the bulbo-medullary nervous system, causing breathing troubles and vomitings, and the cardio-vascular apparatus (acceleration and increase of cardiac contractions first, and, finally, stoppage of the heart). When injected hypodermically, $\frac{1}{40}$ of a milligramme ($\frac{1}{2400}$ of a grain) of Onabaine will in six minutes cause the heart of a frog to stop in systole. Strophanthin will not do as much in the same dose, but requires twelve minutes. Guinea pigs weighing one-half a kilogramme (eighteen ounces) are killed in twenty-five minutes with $\frac{1}{20}$ of a milligramme of Onabaine, while twice as much Strophanthin is necessary to bring on the same result. Dogs and rabbits were also experimented with; but not to occupy too much space with details, suffice it to say that both Onabaine and Strophanthin were found to be much less poisonous when taken through the stomach than when injected into the veins, and that, as a rule, Onabaine proved twice as poisonous and twice as rapid in its effects as Strophanthin. As both glucosides are produced by African plants of the Apocyneæ family, Strophanthin from a seed and Onabaine from the wood of a tree, the Dark Continent must be admitted to be well provided with fine specimens of poisonous plants.

The question very naturally comes up here as to the *modus operandi* of this remedy acting as a diuretic, when it has all along been supposed, and by many the question was regarded as settled beyond a doubt, that Digitalis acted as a diuretic by reason of its increasing blood-pressure.

Here we have a remedy which acts as a diuretic, and yet when com-

pared with Digitalis in this respect its action on the bloodvessels is comparatively nil.

According to the observations of those who have had the most perfect facilities for determining the matter, this diuretic effect is one of its marked characteristics, and it is recommended in cases of cardiac disease where the diuretic action is desired.

Can it be that our teachings have been at fault in this important particular, and that Digitalis does not act as a diuretic coeteris paribus, with the increase of blood-pressure?

I think this supposition can be satisfactorily explained by granting that both Digitalis and Strophanthus give increased power to the heart's action, and consequently that there is increased activity in the vascular system, the result being that all glandular function is more perfectly carried on. This, of course, leaves out of the question all consideration of the effects of blood-pressure in the structure of the kidney.

Strophanthus will undoubtedly be welcomed by the profession as a capital remedy in the treatment of cardiac affections. Without clinical observations it would be difficult to point out all the cases in which it might be used to advantage, but there are some conditions in which Strophanthus is decidedly to be preferred, and in these instances it should invariably have a trial. Professor Fraser regards mitral disease as the most likely to fall within the scope of its action, and the cases he has presented seem to warrant that conclusion.

Dr. Collins, on the other hand, has remarked that all aortic troubles are more amenable to Strophanthus treatment than mitral affections.

My own observations have been uniformly satisfactory in the treatment of both aortic and mitral affections, as well as in cases of incomplete closure of the heart due to atheromatous conditions.

Exophthalmus would be a suitable condition for the use of Strophanthus as respects the heart, but it should be supplemented by Ergot.

In the case of fatty degeneration of the heart, Strophanthus, it seems, is clearly entitled to supersede Strychnine and Nux vomica, and the same may be said of the later months of pregnancy, when the cardiac muscle has become flabby and there is persistent œdema. Its applicability in the later stages of pneumonia, when the nutritive processes are at a low ebb and the heart demands a tonic, it seems, .is clearly indicated.

Frequently it will be far safer to depend upon than Alcohol, and need not interfere with the administration of special stimulants, such as Ammonia. Typhoid fever, when the first sound of the heart becomes weak, will demand Strophanthus, and especially should this suggestion be acted upon when it is deemed advisable to administer Anti-

febrin during its course. As a means of counteracting the tendency to heart-failure in the administration of ether and chloroform, it will eventually outrank Morphine and Atropine, and as an antidote to the baneful effects of Chloral its value cannot be overestimated.

ZINCUM.

(The Cyanides in Cardiac Disorders, especially the Cyanide of Zinc.)

I have often asked myself why the cyanides are not more used in diseases of the heart. Hydrocyanic acid is one of the most potent and deadly of all the heart-poisons. It kills by causing paralysis of the cardiac nerve-supply, probably by acting on the origin or roots of the nerves in the medulla. It is not probable that it will cause or be useful in structural disorders of the heart, for its action is too transient (like Glonoin or Amyl). But when this acid is combined with alkaloids or minerals, we ought to get medicines which profoundly affect both the nerves and muscular tissues of the heart.

The most important of the cyanides are

Cyanide of gold,
" " silver,
" " mercury,
" " potassium,
" " zinc.

Of the cyanide of gold we have no provings or chemical experience, but it ought to prove a powerful and unique remedy in functional heart troubles, especially in young men and women at the age of puberty, and in women at the change of life.

We have a few symptoms of the cyanide of silver. The "violent pain in the region of the sternum" (heart), the "incessant cough and feeling of suffocation," point to cardiac oppression.

Cyanide of potassium (*kali cyanatum*) is better known. There is an excellent pathogenesis in Allen's Encyc. Mat. Med. Its paralyzing effect on the cardiac and respiratory nerves is rapid and fatal. The chief indication for its use is in neuroses of the heart, angina pectoris, etc., when the "terrible sense of suffocation" is the most prominent symptom. The breathing is sometimes very slow, stertorous—as in opium—and irregular. The pulse is also slow, irregular, scarcely perceptible, and there is always cyanosis. The spasm and tetanic conditions closely resemble Strychnia.

Cyanide of mercury is one of the most virulent of this class. It unites the neurotic effects of Hydrocyanic acid with the destructive effects of Mercury. It is the most *similium* of malignant diphtheria

known. It kills as diphtheria sometimes kills, namely, by profound and rapid poisoning of the nerve-centres, without showing throat-lesions. It is capable of causing diphtheritic, ulcerative endocarditis, and its early and timely administration in diphtheria will prevent the cardiac paralysis or endocarditis which renders that disease so dangerous. In syphilitic heart-lesions it ought to prove one of our best remedies.

Cyanide of Zinc, from its composition, bids fair to prove a great addition to cardiac therapeutics. A study of the symptoms of the acid, and of zinc, will show its importance. We have only a few symptoms of the Cyanide, but even those are suggestive:

"Bad temper. Very subject to anger. Very great sensitiveness. Congestion to the head. The face suddenly changes color. Great physical agitation. General trembling from time to time."

Few as they are, they present a picture of the mental and physical condition of persons who are the victims of cardiac neuroses, especially when it occurs in hysterical women or neurasthenic men.

I have for many years used the Valerianate of Zinc in cardiac nervous affections and found it efficacious. The Picrate of Zinc is an excellent remedy in neurasthenic persons. In some special cases, when acid hydrocyanic was indicated, as well as Zincum, I have found the Cyanide to have happy effects.

Prof. Laskevitch highly praises the Cyanide in cardiac neuroses, in which he says he gets more satisfactory results than from any other drug. It acts quickly and certainly. Palpitation, want of rhythm and pain in the region of the heart are quickly affected, sometimes, indeed, cured by this drug. Similar good effects are produced when there is organic cardiac disease.

The regulating action of Cyanide of Zinc in valvular insufficiency is less marked than its effect in cardiac neuroses; nevertheless, there were cases in the wards where it acted better than Digitalis, Convallaria, Adonis, etc. In this respect it acted particularly satisfactorily in cases where other remedies could not be given without producing gastric derangement. Here it improved the action of the heart, increasing the secretion of urine, moderating the pulse, and diminishing the dropsy. In a case of nervous palpitation, with hysterical suppression of urine, Cyanide of Zinc diminished the palpitation and restored the urinary secretion.

Dr. L. prescribes $\frac{1}{10}$ grain three times a day. Two or three grains of the 2x trituration acts better.

In some cardiac diseases, functional and organic, gastric irritation and pain are common. Spasmodic retching and gastralgia seem to be sympathetic. In such cases the Zinc Cyan. will be particularly appli-

cable, for Henning, a German physician, has used it with extraordinary success in cramps of the stomach. It formed the chief ingredient, in combination with magnesia and cinnamon, of his famous "antigastralgic powders." He recommends it in worm affections of children, chorea and other spasmodic diseases.

Ferrocyanide of Zinc has an action on the system similar to the cyanide, with the addition of the ferric influence. In cases where the blood was impoverished, where the cardiac disease was complicated with or due to anæmia, this preparation would be better than the cyanide. Dose, a grain of the IX trit., three or four times a day.

In my "Therapeutics of New Remedies," I called attention to the Ferrocyanide of Potassium. The chemical experience then recorded is very valuable. It is especially valuable in cardiac disease with chlorosis, neuralgia, hemicrania, feeble digestion, feeble and irritable heart, palpitation, weak, irregular pulse, cold feet and hands, etc.

All the cyanides and ferrocyanides should be more extensively used.

PART V.

REPERTORY OF HEART SYMPTOMS.

REPERTORY

OF

HEART SYMPTOMS.

BY

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AUTHORITIES.

Hering:—Abrotanum, Absinthium, Acetic acid, Aconitum, Actea rac., Æsculus hip., Æthusa, Agaricus, Agnus cast., Ailanthus, Aloes, Alumina, Ambra, Ammonium carb., Ammonium mur., Anacardium orient., Antimonium crud., Antimonium tart., Apis, Apocynum, Argentum met., Argentum nit., Arnica, Arsenicum alb., Asafœtida, Asarum, Aurum met., Baptisia, *Baryta carb., Belladonna, Benzoic acid, Berberis, Bismuthum, Borax, Bovista, Bromium, Bryonia, Cactus, Caladium seq., Calcarea carb., Calcarea phos., Camphora, Cannabis sat., Cannabis ind., Cantharis, Capsicum, Carbo veg., Causticum, Cepa, Chamomilla, Chelidonium, *Cicuta vir., Cina, Cinchona, Clematis, Cocculus, Coffea, Colchicum, Colocynthis, Conium, *Crocus, Cyclamen, *Digitalis, *Dulcamara, Eupatorium purp., Ferrum met., Fluoric acid, Gelsemium, Glonoinum, Graphites, Guajacum, Hamamelis, Helleborus, Hellonias, Hepar sulph., Hyoscyamus, Hydrastis, Hypericum, Ignatia, Illicium anis., Ipecacuanha, Jacea, Kali bich., Kali carb, Kali jod., Kalmia, Kreosotum, Lachesis, Lachnanthes, Laurocerasus, Ledum, Leptandra, Lilium tig., Lithium carb., Lobelia infl., Lycopodium, Magnesia mur., Mancinella, Manganum acet., Mercurius, Mercurius cor., Mercurius jod. flav., Mercurius jod. ruber, Mezereum, Millefolium, Muriaticum acid, Natrum carb., Natrum mur., Nitric acid, Nitrum, Nux mosch., Nux vom., Oleander, Opium, Oxalic acid, Paris quad., Petroleum, Phosphorus, Phosphoric acid, Phytolacca, Platina, Plumbum, Podophyllum, Psorinum, Pulsatilla, Ranunculus bulb., Ranunculus scel., Rheum, Rhododendron, Rhus tox., Rumex, Ruta grav., Sabina, Sambucus, Sanguinaria can., Sarsaparilla, Secale, Sepia, Silica, Spigelia, Spongia, *Squilla, Stannum, Staphisagria, Stramonium, Sulphur, *Tabacum, Tellurium, Terebinthina, Theridion, Thuya, Ustilago, *Valeriana, Veratrum alb., Veratrum vir., Zincum.

Allen:—Aconitine, Aconitum cam., Aconitum ferox, Amygdalæ amaræ aqua, Amyl nitrite, Anantherum, Angustura, Asclepias tub., Atropinum, Asparagus, *Baryta carb., Baryta acet., Bufo, Centaurea tag., Cereus bon., Cereus serp., Chininum ars., Chininum sulf., Chloralum, Cicuta vir., Coca, *Crocus, Croton tig., Crotalus hor., Cuprum acet., Curare, *Digitalis, *Dulcamara, Euphrasia, Hellonias, Hydro-

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*Some symptoms from both Hering and Allen.

cyanic acid, Iberis, Jaborandi, Jatropha, Juniperus virg., Kali brom., Kali chlor., Kali cyanat., Kali ferrocyanat., Kali nitricum, Lactuca, Lycopus virg., Maté, Mercurius cyanat., Menyanthes.

General Medical Literature:—Adonis vernalis, Adonis æstivalis, Caffeine, Baryta acetica, Baryta muriatica, Convallaria majalis, * Oleander, Sparteine, Sterculia acuminata (Kola nut), Stigmata maidis, Strophanthus.

HOW TO USE THE REPERTORY.

The heart symptoms are subdivided into sections as follows: "Mental Symptoms," "Symptoms of Cardiac Action and Pulse Characters Not Definitely or Specifically Recorded as Being Characterized by Acceleration or Retardation," "Slow Cardiac Action and Pulse," "Increased Cardiac Action and Pulse-rate," "Ebullitions, Orgasm, Etc," "Palpitation," "Sensations," "Pains," "Clinical Symptoms." The subheadings are manifest at a glance on consulting the section in which you seek to find a symptom. If you wish to know more about the symptom than you find under a sub-caption, turn to the completed symptom (under the name of the remedy) at the head of the section, where the names of all the medicines the symptoms of which have been repertorialized are arranged alphabetically.

E. R. Snader, M.D.

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* From Hering and General Medical Literature.

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Aconitum: Anxiety about the præcordia, heart beats quicker and stronger; fear of death.

Agaricus: Anxious sensation of pressure.

Ambra: Anxiety at the heart, causing oppression of breathing, with flushes of heat.

Ammonium carb.: Great anxiety, as if dying, with audible palpitation.

Anantherum: Burning and sensation of weight in the heart, with sadness, anguish and fear of death. Stitches and formication in the heart, with great anxiety. Violent palpitations, with suffocative attacks, from the least emotion.

Antimonium tart.: Great præcordial anxiety, with vomiting of mucus and bile.

Argentum: Fear of apoplexy, particularly with palpitation of heart.

Argentum nit.: Noticing the beating of the heart increases it.

Arnica: Violent attacks of anguish.

Arsenicum: Palpitation of the heart, with anguish.

Asparagus: Palpitation of the heart, with anxious restlessness, increased by motion and going up-stairs.

Aurum: Great anguish, coming from præcordial region, driving him from place to place; palpitation. Frequent attacks of anguish about the heart, with tremulous fearfulness. Palpitation, with great agony.

Baryta carb.: Palpitation of the heart, which is renewed when thinking of it, for then it makes her anxious, most at midday.

Belladonna: Pressure in cardiac region, which arrests the breathing and causes a sense of anxiety.

Calcarea: Palpitation with anxiety.

Calcarea phosph.: Palpitation with anxiety, followed by trembling weakness, particularly of the calves.

Camphora: Præcordial anxiety; restless, tossing about; palpitation of the heart. Præcordial distress when loudly spoken to.

Cannabis sat.: Anxious and apprehensive feeling at the pit of the stomach, with oppression of breathing and palpitation.

Cantharis: Anxiety about the heart.

Causticum: Oppression at the heart, with lowness of spirits.

Centaurea tag.: Sensation of dilatation of the heart, with anxiety.

Chininum sulph.: Extreme præcordial anxiety. Owing to indignation, in the morning, palpitation, better lying on it, alternating with change of position, stretching, etc.

Cocculus: Palpitation of the heart from quick motion and mental excitement, with dizziness and faintness.

Colchicum: Violent palpitation, with anxiety.

Crocus: Anxious palpitation of the

heart (Hering). Warmth about the heart, with anxiety, and some oppression of breathing, so that she cannot breathe deeply, with inclination to take a deep breath; she feels relieved every time after frequent yawning (Allen).

Cuprum: Anxious feeling about the heart.

Digitalis: Sensation as if the heart would stop beating if she dared to move (Hering). A sudden sensation as though the heart stood still, with great anxiety (Allen).

Gelsemium: Fears that unless constantly on the move her heart will cease beating.

Glonoinum: Anxiety in the præcordia; weakness.

Graphites: Palpitation, with anxiety; with nosebleed.

Hydrocyanic ac.: Anxiety in the præcordium. Præcordial anxiety, alternating with slight vertigo, pain in the same locality, not increased by pressure.

Jacea (Viola tricolor): Anxiety about the heart when lying, with beating like waves.

Jatropha: Uneasiness in the night, from palpitation and rush of thoughts.

Kali nit.: Violent beating of the heart in the evening, in bed, on account of which he woke. Violent beating of the heart while lying upon the back, so that he awoke at midnight, and sat up, full of anxiety.

Kalmia: Anxiety, with palpitation.

Kreosotum: Anxiety at the heart.

Lachesis: Anxiety about the heart; hasty speech; restless.

Lachnanthes: Anxiety about the heart, with stitches.

Lilium: Fears he has heart disease.

Lycopus virg.: The cardiac distress and palpitation were increased by ascending (hill or stairs), by excitement, by deep inspiration, and by thinking of them.

Mercurius: Palpitation, with fear, worse at night. Weakness at the heart, as if life was ebbing away. Awakens with trembling at the heart, as if frightened.

Millefolium: Anxious, with pain in the heart.

Natrum carb.: Violent, anxious palpitation of the heart when ascending and at night when lying on the left side.

Nitric ac.: Palpitation and anguish on going up-stairs.

Nux mosch.: Heart-beats intermit, the intervals so long that they excite fear of death.

Nux vom.: Palpitation from mental emotions.

Oleander (Hering): Anxious palpitation; chest feels expanded (Gen. Lit.). Distress at the heart and anxiety. Anxiety about the heart without anxious thoughts, with trembling of the whole body.

Oxalic ac.: Heartburn intermits, when thinking of it.

Podophyllum: Palpitation from mental emotions.

Pulsatilla: Violent paroxysms of palpitation, often with anguish and obscuration of sight.

Sarsaparilla: Palpitation without fear; mostly during the day.

Sepia: Palpitation of heart after emotions of mind. Interruption of beating of heart most after dinner, alarmed; quivering motion. Palpitation with anxiety about things that happened years ago.

Spigelia: Stitches about the heart; sometimes synchronous with the pulse, with anxiety and oppression.

Spongia: Suddenly awakened after midnight, with suffocation, great alarm, anxiety.

Stannum: From giving directions in her domestic affairs, great palpitation of heart and anxiety.

Sulphuric ac.: Palpitation with or without fear or anxiety.

Sumbul: Palpitation of the heart, violent and visible, prolonged after running up-stairs; palpitation of the heart after drinking beer, increased by paying attention to it.

Tabacum: Sudden anxiety (with angina pectoris) (Hering). Suddenly seized in the evening with violent præcordial anxiety, followed by complete sleeplessness and springing from bed (Allen).

Tarantula: Inability to lie down on account of the extreme anguish it caused in the præcordial region; did not retire to bed nor sleep for four nights. Oppression and pain at the heart as if a misfortune had happened, with weeping and moaning, followed by cramps and coldness in the extremities. Palpitation, with sadness, inclined to tears, oppression, headache, with general perspiration and burning heat.

Thea: Acute pain, as from a spasm, in the region of the heart; and in spite of all his efforts he felt as if he was continually falling into deliquium. Anxiety in the præcordium.

Theridion: Anxiety about heart; sharp pains radiate to arm and left shoulder.

Veratrum alb.: Violent, visible, anxious palpitation, with fainting.

Anxiety: Acon., Agar., Ananth., Ambra, Amm. carb., Ant. tart., Aspar., Bellad., Calcar., Calc. phosph., Camphora, Cann. sat., Cent. tag., Chin. sulph., Colchic., Crocus., Cup. met., Digit., Glonoin., Graph., Jacea, Kali nit., Kalmia, Kreos., Laches., Lachnanth., Millef., Natr. carb., Oleand., Sepia, Spigel., Spongia, Thea, Tabac., Therid., Verat.

Anxiety about the Heart: Acon., Ambra, Camphora, Cann. sat., Canthar., Cuprum, Glonoin., Jacea, Kreos., Laches., Lachnanth., Therid.

Heart beats quicker and stronger; *fear of death*: Acon.

With sensation of pressure: Agar.

Causing oppression of breathing and flushes of heat: Ambra.

With sudden sensation, as though the heart stood still: Digit.

With vomiting of mucus and bile: Ant. tart.

With weakness: Glonoin.

With sensation of dilatation of heart: Cent. tag.

When lying, with beating like waves: Jacea.

With hasty speech; restless: Laches.

With stitches: Lachnanth.

Sharp pains radiate to arm and left shoulder: Therid.

Anxiety and apprehensive feeling at pit of stomach, with oppression of breathing and palpitation: Cann. sat.

— — and Palpitation: Amm. carb., Ananth., Aspar., Camphora, Chin. sulph., Colchic., Crocus, Jatropha, Natr. carb., Lyc. virg., Oleand., Sepia, Stann., Sumbul, Tarant., Ver. alb.

As if dying, with audible palpitation: Amm. carb., Bar. carb.

With nosebleed: Graphit.

When ascending, and at night when lying on the left side. Natr. carb.

Chest feels expanded: Oleand.
With anxiety about things which happened years ago: Sepia.
With or without anxiety: Sulph. ac.
Without anxiety: Sarsap.
Violent, anxious, visible palpitation, with fainting: Ver. alb.

Anguish: Ananth., Arnica, Aurum, Nitr. ac., Pulsat., Tarant.
Coming from præcordial region, driving him from place to place. Frequent attacks of anguish about the heart, with trembling fearfulness: Aurum.
And palpitation on going upstairs: Nitr. ac.
Violent paroxysms of palpitation, often with anguish and obscuration of sight: Pulsat.

Agony: Aurum (with palpitation).

Alarm: Sepia, Spongia.

Fear: Ananth., Acon., Mercur., Lil. tig., Nux mosch.
Of death: Acon., Ananth.
With palpitation: Mercur.
Of apoplexy, with palpitation: Nux mosch.
Palpitation without fear, mostly during day: Sarsap.

Inclined to tears: Tarant.

Weeping: Tarant.

Moaning: Tarant.

Sadness: Ananth.

Oppression: Ambra, Cann. sat., Caustic., Spigel., Tarant.
Of breathing and flushes of heat: Ambra.
Of breathing and palpitation: Cann. sat., Caustic.
With lowness of spirits: Caustic.
And stitches about the heart, sometimes synchronous with the pulse: Spigel.
And pain as if some misfortune had happened: Tarant.

Peculiar Symptoms.

Great anxiety, as if dying, with audible palpitation: Amm. carb.
Fear of apoplexy, particularly with palpitation: Arg. met.
Noticing the beating of the heart increases it: Arg. nitr., Bar. carb., Lyc. virg.
Præcordial distress when loudly spoken to: Camphora.
Sensation as if the heart would stop beating if she dared to move: Digit.
Fears that unless constantly on the move her heart will cease beating: Gelsem.
Fears he has heart disease: Lil. tig.
Weakness at the heart as if life was ebbing away: Mercur.
Palpitation of the heart, renewed when thinking of it: Bar. carb.
Sensation of dilatation of the heart, with anxiety: Cent. tag.
Violent beating of the heart while lying upon the back: Kali nitr.
A sudden sensation as though the heart stood still, with anxiety: Digit.
Oppression and pain at the heart as if a misfortune had happened: Tarant.
He felt as if he were continually falling into deliquium: Thea.
Præcordial anxiety, alternating with slight vertigo: Hydr. ac.
Awakens with trembling at the heart and agitation as if frightened: Mercur.
Suddenly awakened after midnight with suffocation, great alarm, anxiety: Spongia.
Heart-beats intermit, the intervals so long that they excite fear of death: Nux mosch.
Heartburn intermits when thinking of it: Ox. ac.
Stitches about the heart, sometimes synchronous with the pulse, with anxiety and oppression: Spigel.
From giving directions in her domestic affairs, great palpitation of heart and anxiety: Stannum.

AGGRAVATIONS.

Worse from indignation: Chin. sulph.
At night: Mercur., Natr. carb., Spongia.
With fear: Mercur.
At midnight: Kali nitr.
In bed: Kali nitr.
After midnight: Spongia (with suffocation).
During the day: Bar. carb., Chin. sulph., Sarsap.
At midday: Bar. carb.
In the morning: Chin. sulph.
After dinner: Sepia.
When ascending: Natr. carb. Nitr. ac., Lyc. virg.
On going up-stairs. Nitr. ac.
While lying: Jacea, Kali nitr.
Lying on the back: Kali nitr.
With restlessness: Aurum, Camphora, Laches.
Driving from place to place: Aurum.
Tossing about: Camphora.
Worse from motion: Aspar.
Worse quick motion: Coccul.
Worse from deep inspiration: Lyc. virg.
Worse mental excitement: Coccul., Lyc. virg.
Worse mental emotions: Nux vom., Podoph., Sepia.
Palpitation renewed when thinking of it: Arg. nit., Bar. carb., Lyc. virg., Sumbul.
Palpitation after drinking beer, increased by paying attention to it: Sumbul.

AMELIORATIONS.

Better from pressure: Chin. sulph. (palpitation).
Better from change of position: Chin. sulph.
Better from stretching: Chin. sulph.
Better sitting up: Kali nitr.
Relieved by yawning: Crocus.
Pain not increased by pressure: Hydr. ac.

CARDIAC ACTION AND ACCOMPANIMENTS.

SYMPTOMS OF CARDIAC ACTION AND PULSE CHARACTERS NOT DEFINITELY OR SPECIFICALLY RECORDED AS BEING CHARACTERIZED BY ACCELERATION OR RETARDATION.

Abrotanum: Weak and small.
Absinthium: Heart thumps; can be heard in the scapular region.
Acetic ac.: Very weak and small.
Aconitine: Weakness of the beating and sounds of the heart. Heart's action almost imperceptible.
Aconitum: Small, intermittent, irregular; quicker than the beat of the heart; full, hard (and frequent), succeeding chill, during which it was small and weak. During three beats the apex strikes only once.
Aconitum cam.: Pulse and beat of heart sometimes intermit for several seconds.
Acetea: Feeble in the morning, with trembling and weakness. Heart's action ceases suddenly; impending suffocation.
Agaricus: Feeble, scarcely perceptible.
Agnus: Often imperceptible.
Aloes: Suppressed after vomiting.
Alumina: Either unchanged or full (and accelerated).
Amygdalæ am. aq.: Heart beats very feebly. Beat of heart feeble, sometimes intermittent.

Pulse scarcely perceptible. Pulse becomes imperceptible.

Amyl nitr.: The beating of the heart and of the carotids is in some persons very marked. Cardiac oppression and tumultuous heart action. Tumultuous heart action. In all cases the pulse was the first function to show any indication of the action of the drug. The sphygmographic pulse-curve ends abruptly in a very sudden downfall.

Apis: Feeble, scarcely perceptible at wrist; at times intermittent and imperceptible.

Apocynum: Pulse 45 between attacks of vomiting; feeble.

Argentum: Beat sometimes omits; often unchanged.

Argentum nitr.: Irregular, intermittent, with an unpleasant sensation of fulness; exertion causes strong beating, worse when noticing it.

Arnica: Intermittent, feeble, hurried, irregular, fluttering.

Arsenicum: Heart beats more rapidly and stronger when lying on the back.

Asafœtida: Unchanged; unequal.

Asclepias tub.: Pulse a little disturbed after dinner.

Asparagus: Irregular, quickened, two-fold stroke of the heart. Pulsation of the heart perceptible to the feel and hearing; also upon moderate motion. The beat of the heart hardly perceptible. Pulse small and compressible.

Aurum: Violent beating of the heart after exertion.

Baryta ac.: Irregular pulse.

Baryta mur.: Beating of the heart very irregular; pulse scarcely perceptible. Pulse soft and irregular.

Belladonna: At times small and soft.

Benzoic ac.: Full.

Bismuthum: Strong heart-beat; pulse contracted, somewhat spasmodic, and at times intermittent.

Borax: Circulation irregular, face bluish, especially around the mouth, nose and eyes, with blue look of finger-ends and feet; with attacks during which the child became prostrated and as if suffocating.

Cactus: Irregularity of the heart's action (at times frequent; at others slow).

Camphora: Full, weak; not perceptible.

Cannabis sat.: Very weak; frequently almost imperceptible.

Cantharis: Very variable; at times intermittent, feeble, scarcely perceptible.

Capsicum: Irregular, often intermitting.

Carbo veg.: Thread-like, weak and small; intermittent.

Cereus bonplandi: Pulse a little irregular just after dinner. A little before 6 A.M. counted pulse for one minute; found several dicrotic beats and intermissions in that time.

Chamomilla: Frequently very unequal, and then for a time weak.

Chininum sulph: Extreme præcordial anxiety. This evening, at 6 o'clock, a nap, with hands joined over top of head, lying on back; was awakened at 6.45; the heart beat with abnormal impulse, felt through most of chest (and too frequently); better by lying still a while, then stirring about moderately. Pulse regular and very weak; scarcely perceptible.

Cinchona: Feeble, unequal, intermitting.

Cicuta vir.: Pulse weak. Pulse

soft, small and scarcely perceptible.

Clematis: Unchanged.

Conium: Unequal in strength and sometimes irregular in rhythm.

Crotalus hor.: Pulse scarcely perceptible, with faintness. Pulse not perceptible at the wrist.

Croton tigl.: Very perceptible pulsation and throbbing of the heart. Pulse small. Small and contracted pulse. Pulse at first weak, becoming stronger and fuller, then regular.

Cuprum: Very changeable, thready, tense.

Cuprum ac.: Pulse small, irregular, at times convulsive. Pulse small, contracted, but regular.

Curare: Irregular pulse, sometimes intermitting and always hard.

Digitalis: Violent, but not very rapid, beating of the heart. Intermitting the third, fifth or seventh beat.

Dulcamara: Collapsed (Hering). Great cardiac excitement. Pulse quiet, but small and rather hard, in the evening (Allen).

Gelsemium: A peculiar action of the heart, as though it attempted its beat, which it failed fully to accomplish, the pulse intermitting each time; worse lying, especially on the left side.

Glonoinum: Laborious action of the heart; easily excited.

Helleborus: Almost imperceptible.

Hyoscyamus: Weak and irregular.

Hydrocyanic ac.: Heart's action very weak. Heart's action very irregular, pulse hardly to be felt. Pulse irritable, small and of unequal force. Pulse not perceptible, while the action of the heart was but feebly to be felt. No radial pulse on either side.

Hypericum: Hard beating of the heart.

Iberis: Irregularity increased by exertion.

Ignatia: Variable.

Jaborandi: Sphygmographic tracings, at different stages of the administration of this drug, showed almost complete asystolia, with a very noticeable diminution of vascular tension during the sweating stage. No close relation existed between the rapidity of the pulse and the fall of temperature; in one lad, whose pulse was intermittent, the medicine entirely relieved this irregularity.

Jatropha: The beating of the heart suddenly became distinct to the hand, and was even felt in the chest. Violent beating of the heart, shaking the chest, when walking slowly about the room. Almost pulseless. Pulse small, thready and intermittent.

Kali bich.: Irregular, small, contracted, with nosebleed.

Kali brom.: Heart's action feeble and intermitting.

Kali carb.: Intermits; heart's action irregular or weak.

Kali chlor.: Violent, almost audible beating of the heart, oppression of the chest, and cold feet.

Kali nitr.: Violent beating of the heart, in the evening, in bed, on account of which he woke. Violent beating of the heart while lying upon the back, so that she awoke at midnight, and sat up full of anxiety.

Kalmia: Arms feel weak; pulse scarcely perceptible; limbs cold. The third or fourth beat is harder and is followed by an intermission.

Kreosote: Small and hard.

Laurocerasus: Irregular. Often imperceptible.

Lilium tigr.: Rapid beating, 160 to 170 per minute.

Lycopodium: Unaltered.

Lycopus virg.: Cardiac depression, causing faintness, in the evening. Intermittent character of cardiac pulsation; intermission at seventh, eighth, sixth, twenty-first, ninth, twenty-third and eighty-eighth, on waking at 6.30 A.M.; later the heart beats regularly at 70.

Manganum acet.: Very uneven and irregular (sometimes rapid, soft; slow); but constantly soft and weak.

Maté: Acts more strongly on the heart than any other similar beverage.

Mercurius: Imperceptible, with warmth of the body.

Mercurius cor.: Small, weak, intermitting; sometimes trembling.

Mercurius cyan.: Violent and abrupt beating of the heart. Pulse 70 to 76; small, but compressible. Heart's impulse and sound weak.

Mercurius iod. flav.: Sudden, spasmodic action; labored, weak, irregular.

Mezereum: At times intermittent.

Naja trip.: Unusual beating of the heart, audible to himself.

Natrum mur.: Irregular intermission of beating of heart and of pulse; worse lying on left side. Intermits every third beat.

Nicotinum: Constant sinking of the pulse.

Nitric acid: Irregular. One normal, followed by two small, rapid beats, fourth beat intermits.

Nux mosch.: Small, weak; intermits, the intervals so long that they excite fear of death.

Nux vom.: Intermits every four or five beats.

Oleander: Pulse small, irregular, periodically intermitting. Intermissions every fourth or fifth beat. Pulse very irregular, at one time rapid, at another very slow (Hering). At one time full, at another very soft and weak (Allen).

Oleander: Changeable, irregular.

Opium: Pulsating arteries and swollen veins on the neck. Pulse varies. Irregular and unequal; imperceptible.

Phosphoric ac.: Irregular, sometimes intermitting one or two beats.

Physostigma: I took a cup of strong coffee, after which I speedily felt an indefinable change within me, and, on examining the condition of the heart, I found it had become perfectly and permanently regular. Happening to get on the left side, my attention was, for the first time, directed to the tumultuous action of the heart, which compelled me to turn on the back again, to escape the strange sensation. Heart's action irregular; intermissions every third, fourth or fifth beat. The heart and pulse extremely feeble and tumultuously irregular. Pulse of the right side nearly double the strength of that of the left.

Phytolacca: Small, irregular, with great excitement in the chest, especially in the cardiac region; full, but soft.

Pilocarpinum: Weakness of the heart. The pulse-curve at first exhibits an increased systolic elevation, a more abrupt curve, a more sudden downfall, and a very decided recurrent elevation; the artery is filled rapidly and violently and collapses suddenly; symptoms of relaxed tone of the vessels and accelerated heart's action; the character of the pulse-curve is most

pronounced after ten or fifteen minutes; it gradually returns to the normal. Diminution of the arterial tension a few minutes after the injection, even before perspiration. After the perspiration the pulse falls and gradually sinks to the normal.

Platina: Regular, but sometimes weak, sometimes tremulous.

Plumbum: Variable.

Psorinum: Weak, feeble.

Pulsatilla: Small and weak; often scarcely perceptible.

Rheum: Generally unchanged.

Rhododendron: Heart's beat stronger. Unchanged.

Rhus: Irregular, trembling or imperceptible.

Rhus ven.: Pulse 72, rather weak.

Ruta: Unchanged.

Sabina: Unequal.

Sanguinaria: Irregularity of heart's action and pulse, with coldness, insensibility, irregularity, with great weakness.

Saponinum: Pulse weak, hardly perceptible. Weak pulse.

Scutellaria: In the evening a marked change in the heart took place, the average number of beats per minute would scarcely exceed the normal standard, but were exceedingly variable, being at one moment strong and full, and then gradually diminishing until they became exceedingly soft and thread-like.

Secale: Often unchanged, even during violent attacks; at times intermittent or suppressed; small, empty, weak.

Sepia: Interruption of the beating of the heart, mostly after dinner; alarmed; quivering motion. Occasional hard "thump."

Spigelia: Irregular, trembling.

Staphisagria: Trembling beating of the heart; often trembling.

Stramonium: Full, hard, strong; irregular; small and spasmodic; sometimes double (and very quick), with quiet respiration.

Strychninum: The heart's action was distinctly felt by the hand applied to the chest. Tumultuous action of the heart. Impulse of the heart strong. Irregular action of the heart. Pulse large and full. Pulse full and strong, but irregular. Pulse imperceptible.

Sumbul: Pulse very compressible during the flush; pulse very irregular; pulse full, very irregular, compressible in the evening.

Tabacum: Aching pain in the cardiac region, generally worse at night, with frequent intermissions of the pulse and of the heart's action. Both sounds of the heart clear, but the action was relaxed and occasionally intermittent. The heart-sounds were muffled and seemed to almost run into each other. Systolic murmur in aortic area and in course of large vessels. On applying the hand over the cardiac region, the impulse conveyed to it was of marked peculiarity, much resembling, as was conceived at the time, the purring tremor, or *fremissement cataire* of French writers, which is likely to accompany aortic regurgitation. Sounds of the heart inaudible, and its movements scarcely felt. Strong pulsation of the temporal arteries. Heart beat so violently he was compelled to give up active exercise. Heart beat irregularly, with a slight anæmic murmur. Heart's action very feeble. Violent pulse. Pulse soft, full and feeble. (Allen). Imperceptible, small, intermittent (Hering).

Tanacetum: Feeble cardiac action and all the signs of impending dissolution. Pulse fuller and more incompressible. Irregular pulse. Pulseless.

Tarantula: Diseases of the heart, and particularly of the circulatory system, become worse after wetting the hands in cold water. Inability to lie down on account of the extreme anguish it caused in the præcordial region; did not retire to bed nor sleep for four nights. Præcordial anxiety; tumultuous beating of the heart. Violent anguish of the heart. Great irregularity in the circulation. Irregular pulse. Trembling at the heart and thumping, as when frightened, or when hearing bad news.

Terebinthina: Pulse thready and scarcely perceptible. Weak, irregular and intermittent in the evening.

Thea: The fluttering of the heart has been succeeded by a momentary suspension of its action and long-continued swoonings. Pulse quick, small and feeble. Very irregular, intermittent pulse. Pulse scarcely discernible and extremely irregular.

Thuya: Violent pulsations in the evening.

Valeriana: In the first quarter of an hour the beats are full and vigorous, in the second the diastole is shorter, the whole body being agreeably warm, and a trembling anxious sensation being experienced, which seems to come out of the abdomen. Pulse weak and small in the forenoon (Allen).

Veratrum vir: Heart beats loud, strong (suddenly increases and gradually decreases below normal); irregular, intermittent.

Zincum: Irregular, spasmodic action of the heart; occasionally one violent "thump."

Pulse Characters.

Large: Bellad., Strychnin.

Small: Abrot., Acet. ac., Acon., Agar., Aspar., Carb.veg., Cicut. vir., Crot. tigl., Cupr. ac., Digit., Dulcam., Hyosc., Ignat., Jatropha, Kali bich., Kreos., Lauroc., Merc. cor., Merc. cyan., Nitr. ac, Nux mosch., Phytol., Plumbum, Pulsat., Squilla, Stramon., Thea, Valer.

Strong: Crot. tigl., Bismuth.s Rhodod., Scutel., Spigelia, Stramon, Strychnin.

Weak: Abrot., Acet. ac., Acon., Agnus, Benz. ac., Berber., Camphora, Cann. sat., Carb, veg., Chin. sulph., Crot. tigl., Coloc., Hydr. ac., Hyosc.. Kalmia, Mang. ac., Merc, cor., Merc. cyan, Merc. iod, flav., Mur. ac., Nux mosch.. Oleand., Pilocarp., Platina. Psorin., Pulsat., Rhodod., Rhu, ven., Sapon., Thuya, Valer., Ver. vir.

During the day: Mercur.

In the morning: Thuya.

Feeble: Amyg. am., Act. rac., Agar., Apis, Apoc., Arnica, Canthar., Cinchon., Colchic., Kali brom., Physos., Tabac., Thea.

With trembling and weakness. Actea.

Full: Acon., Alum., Bellad., Camphora, Colchic., Crot. tigl., Natr. mur., Opium, Oleand., Scutel., Stramon., Strychnin, Sumbul, Tabac., Tanac.

Pulsating arteries and swollen veins in the neck. Opium.

Empty: Secale.

Compressible: Aspar., Merc. cyan., Sumbul.

During the flush: Sumbul.

In the evening: Sumbul.

Incompressible: Tanac.

Tense: Cupr. met.
Contracted: Bismuth., Crot. tigl., Cupr.ac., Kali bich., Plumbum.
With nosebleed: Kali bich.
Hard: Acon., Curare, Dulcam., Hyper., Kreos., Plumbum.
Soft: Bar. mur., Bellad., Cic. vir., Mang. ac., Oleand., Scuttel., Tabac., Ver. alb., Ver. vir.
Constantly soft and weak: Mang. ac.
Tumultuous: Amyl nitr., Physos., Strychnin., Tarant.
Trembling: Merc. cor., Rhus, Spigel., Staphis., Stramon.
Tremulous: Platin.
Thready: Cuprum, Jatropha, Tereb.
Thread-like: Acon., Carb. veg., Scuttel.
Fluttering: Arnica, Thea.
With long-continued swooning: Thea.
Dicrotic: Cereus bon.
Suppressed: Aloes, Secale.
After vomiting: Aloes.
Collapsed: Dulcam.
Almost Imperceptible: Acon., Aconitine, Agar., Agnus, Amyg. am., Apis, Aspar., Cann. sat., Canthar., Chin. sulph., Cic. vir., Crot. hor., Hydr. ac., Kalmia, Lauroc., Oleand., Pulsat., Sapon., Tereb., Thea.
With faintness: Crot. hor.
Arms weak; limbs cold. Kalmi.
Imperceptible: Amyg. am., Camphora, Mercur., Opium, Rhus, Stramon., Strychnin.
With warmth of body: Mercur.
Pulseless: Tanac.
Almost pulseless: Jatropha.
Spasmodic: Bismuth., Stramon., Zincum.
Convulsive: Cupr. ac.
Labored: Merc. jod. flav.
Irregular: Acon., Agar., Arg. met., Atrop., Aspar., Bar. ac., Bar. mur., Borax, Cereus bon., Curare, Cupr. ac., Cactus, Digit., Hyosc., Hydr. ac., Iber., Kali carb., Lauroc., Mang. ac., Merc. jod. flav., Natr. mur., Nitr. ac., Oleand., Opium, Phos. ac., Physos., Rhus, Sanguin., Silic., Spigel., Stramon., Strychnin., Sumbul, Tabac., Tanac., Tarant., Tereb., Thea, Ver. vir., Zincum.
Quicker than the beat of the heart: Acon.
With a slight anæmic murmur: Tabac.
Increased by exertion: Iber.
Circulation irregular, face bluish, especially around the mouth, nose and eyes, with the blue look of the finger-ends and feet, with attacks during which the child became prostrate and as if suffocated: Borax.
Irregularity of the heart's action, at times frequent, at others slow: Cactus.
Sudden, spasmodic action: Merc. jod. flav.
One normal, followed by two small rapid beats: Nitr. ac.; and unequal: Opium.
Irregularity of the heart's action and pulse, with coldness, insensibility; irregularity, with great weakness: Sanguin.
Frequently irregular, and then slow: Silica.
Irregular, spasmodic action. Occasionally one violent thump: Zincum (Aloes, Aurum, Sepia).
Regular: Chin. sulph., Crot. tigl., Cupr. ac., Lyc. virg., Platin., Physos.
But sometimes weak and trembling: Platin.
Unequal: Asaf., Chamom., Cinchon., Clemat., Conium, Opium, Sabina.
And then weak: Chamom.
Unequal in strength and sometimes irregular in rhythm: Conium.
Uneven: Mang. ac.
Intermittent: Acon., Acon. cam.,

Alum., Amyg. am., Arg. met., Arg. nitr., Arnica, Benz. ac., Bismuth., Canthar., Capsic., Carb. veg., Cereus bon., Cinchon., Curare, Digit., Gelsem., Jatropha, Kali brom., Kali carb., Kalmia, Lycop. virg., Merc. cor., Mezer., Mur. ac., Natr. mur., Nitr. ac., Nux mosch., Phos. ac., Physos., Secale, Sepia, Tabac., Tereb., Thea, Ver. alb., Verat. vir.

Quicker than the beat of the heart. During three beats the apex strikes only once: Acon.

Beat sometimes omits: Arg. met.

With an unpleasant sensation of fulness. Arg. nitr.

Slow: Capsic.

The third, fifth or seventh beat intermits: Digit.

A peculiar action of the heart, as though it attempted its beat, which it failed fully to accomplish, the pulse intermitting each time, worse lying, especially on left side. Gelsem.

Every third, fourth or fifth beat: Physos.

Periodically: Oleand.

Every fourth or fifth beat: Oleand.

The third or fourth beat is harder, followed by an intermission. Irregular intermission of the beating of the heart and of the pulse; worse lying on the left side; intermits every third beat: Natr. mur.

Fourth beat intermits: Nitr. ac.

Intermits, the intervals so long that they excite fear of death: Nux mosch.

One or two beats: Phosph. ac.

Or suppressed: Secale.

Interruption of the beating of the heart, mostly after dinner; alarmed; quivering motion: Sepia.

Variable: Canthar., Ignat., Rheum, Plumbum., Scuttel.

Changeable: Cupr. met., Oleand.

Unchanged (often): Alum., Arg. met., Asaf., Rheum, Rhodod., Ruta, Secale.

Even during violent attacks: Secale.

Unaltered: Lycopod.

Easily excited: Glonoin.

Irritable: Hydr. ac.

Violent: Jatropha, Kali nitr., Kali chlor., Merc. cyan., Tabac.

Unclassified and Peculiar Symptoms.

Heart thumps, can be heard in the scapular region: Absinth.

Heart's action ceases suddenly; impending suffocation: Actea.

Noticing the beating of the heart increases it: Arg. nitr.

Exertion causes strong beating, worse noticing it: Arg. nitr.

Strong heart-beat: Bismuth.

Laborious action of the heart: Glonoin.

Hard beating of the heart: Hyper.

Heart beats stronger: Rhodod.

Trembling beating of the heart: Staphis.

Weakness of the beating and sounds of the heart: Acon.

Pulse and heart sometimes intermit for several seconds: Acon. cam.

Pulse scarcely perceptible: Amygd. am.

The beating of the heart and of the carotids is very marked, in some persons: Amyl nitr.

Cardiac oppression and tumultuous heart action: Amyl nitr.

Heart's action irregular, apparently obstructed: Atrop.

Irregular, quickened, twofold stroke of the heart: Aspar.

Pulsations of the heart perceptible to the feel and hearing: Aspar.

Pulse not perceptible at the wrist: Crot. hor.

No radial pulse on either side: Hydr. ac.

Diminution of the vascular ten-

sion during the sweating stage: Jabor.

The beating of the heart suddenly became distinct to the hand, and was even felt in the chest: Jatropha.

Violent beating of the heart, shaking the chest when walking slowly about the room: Jatropha.

Violent, almost audible beating of the heart: Kali chlor.

Violent beating of the heart, in the evening, in bed: Kali nitr.

Violent beating of the heart when lying upon the back: Kali nitr.

Cardiac depression, causing faintness, in the evening: Lyc. virg

Violent and abrupt beating of the heart: Merc. cyan.

Unusul beating of the heart, audible to himself: Naja trip.

Constant sinking of the pulse: Nicot.

The heart and pulse extremely feeble and tumultuously irregular: Physos.

Pulse of the right side nearly double the strength of that of the left: Physos.

Diminution of arterial tension, even before perspiration: Pilocarp.

The heart's action was distinctly felt by the hand applied to the chest: Strychnin.

The heart sounds were muffled and seemed to almost run into each other: Tabac.

Systolic murmur in aortic area and in the course of large vessels—(?): Tabac.

Sounds of the heart inaudible, and its movements scarcely felt: Tabac.

Feeble cardiac action and all the signs of impending dissolution: Tanac.

The flutterings of the heart have been succeeded by a momentary suspension of its action and long-continued swoonings: Thea.

AGGRAVATIONS.

Position.

Worse lying: Mercur., Tanac.

Worse lying on left side: Mercur., Natr. mur., Physos.

Worse lying on the back: Chin. sulph., Kali nitr.

Motion.

Worse from motion: Aspar.

Exertion.

Worse from exertion: Arg. nitr., Aurum.

Worse after exertion: Iber.

Worse from active exercise: Tabac.

Time.

Worse in the morning: Lyc. virg. (on awaking, intermission).

Worse in the forenoon: Valer.

Worse in the afternoon: Cereus bon.

Worse in the evening: Chin. sulph., Dulcam., Kali nitr. (in bed), Lyc. virg., Scuttel., Sumbul, Tereb.

Worse at night: Tabac.

Miscellaneous.

Worse after dinner: Ascl. tub., Cereus bon., Sepia.

Worse noticing the beating of heart: Arg. nitr.

Worse after wetting the hands in cold water: Tarant.

AMELIORATIONS.

Better from perspiration: Pilocarp. (pulse acceleration).

Better by lying still awhile: Chin. sulph.

Better from moderate motion: Chin. sulph.

Better sitting up: Kali nitr., Tarant.

Better lying on the back: Physos.

Better from coffee: Physos.

SLOW CARDIAC ACTION AND PULSE.

Acon., Aconitine, Acon. cam., Acon. fer., Adonis ver., Agar., Agnus, Aloes, Amygd. am., Ananth., Apoc., Argent., Aspar., Atrop., Baptis., Bar. ac., Bufo, Bar. carb., Bellad., Benz. ac., Berber., Cactus, Caffeine, Cann. ind., Cann. sat., Canth., Capsic., Cepa, Chin. sulph., Chloral., Cic. vir., Chelid., Coca, Conval., Colchic., Coloc., Crot. hor., Cupr. ac., Digit., Dulcam., Gelsem., Graphit., Helleb., Hydr. ac., Hyosc., Iber., Ignat., Jabor., Junip. vir, Kali brom., Kali cyan., Kali ferocy., Kali nitr., Kalmia, Kreos., Lactuca, Lyc. virg., Lobel., Mang. ac., Mercur., Merc. cyan., Menyanth., Mezer., Naja tr., Nicot., Nitrum, Oleand., Opium, Paris, Petrol, Pilocarp., Physos., Plumbum, Pulsat., Ran. bulb., Rhodod., Sambuc., Sarsap.,Secale, Scuttel., Spigel., Stercul. acum., Strophanth., Strychnin., Sumbul, Squilla, Tabac., Tanac., Tarant., Tereb., Thea, Thuya, Valer., Veratr., Ver. vir., Zincum.

Aconite: When slow, almost imperceptible, thread-like, with anxiety.

Aconitine: Pulse at first, on entering a warm room, more frequent, then sinks far below normal, is small, weak and intermittent. Pulse falls to 60, and, in two hours after taking the medicine, was so feeble as to be almost imperceptible and difficult to count.

Aconitum cam.: Pulse slow, 51; small and weak, can hardly feel it. Pulse sinks, becomes irregular, small, weak.

Aconitum fer.: Pulse small, weak, 60.

Adonis vern.: The pulse is slowed and the force of the systolic contraction increased.

Agaricus: Becomes slower, small, irregular.

Agnus: Slow and weak.

Aloes: Slow in the afternoon.

Amygdalæ am. aq.: Pulse at first small, frequent and intermittent, then slow and regular. Pulse full and strong, but slow. Pulse slow and vibrating. Pulse from 70 down to 30, very feeble in carotid and radial arteries. Pulse slow and flickering. Diminished pulse.

Anantherum: Pulse slow and full, then accelerated, hard and dicrotic.

Antimonium crud.: Changing slow to rapid every few beats.

Apocynum: Pulse 45 between attacks of vomiting.

Asclepias tub.: Pulse rose from 64 to 88; small.

Atropinum: Weak doses accelerate the heart and increase blood pressure; poisonous doses have the reverse effect. Pulse 60.

Baptisia: At first accelerated, afterwards slow and faint.

Baryta ac.: Pulse remained pretty regular, but notably slackened (56 instead of 70); 65, 56; as low as 25.

Belladonna: Large, full and slow.

Benzoic ac.: Slower and weaker, intermittent.

Berberis: Slow, weak pulse.

Bufo: The heart-beats are sometimes quick, sometimes slow, intermittent or irregular.

Caffeine: In moderate doses diminishes the heart's pulsations.

Cactus: At times frequent, at others slow.

Cannabis ind.: Pulse slow, as low as 46.

Cantharis: At times intermittent,

slow, feeble, scarcely perceptible.

Capsicum: Slow, intermitting.

Cepa: Slow and hard.

Chininum sulph.: Slowness of the pulse. Action on the circulation was constant; it usually occurred half an hour after taking, and proportionate to the size of the dose, producing slowness of the pulse. Pulse regular, slow and scarcely perceptible.

Chloralum: Pulse diminished.

Cicuta vir.: Pulse slow and full. Pulse small and slow.

Coca: Pulse 60.

Colchicum: Full and slow; slow and feeble.

Colocynth.: Less slow and weak.

Convallaria maj.: The heart is at first slowed, but afterwards becomes accelerated.

Crotalus hor.: Pulse at first full, hard and rapid, then weak and slow. Pulse low and about 60 strokes in the minute.

Cuprum ac.: Pulse large, slow and intermitting.

Digitalis: Small, irregular, slow; extremely slow, particularly when at rest.

Dulcamara: Pulse slow, intermitting.

Erythrophlœum (Casca Bark): Slow and irregular action of the heart (in animals).

Gelsemium: Feeble, slow; slow and full.

Graphites: Slow during the day and evening.

Helleborus: Often slower than the beating of the heart.

Hellonias: Pulse at the wrist weak, hardly perceptible, and about 60 beats to the minute. Pulse small, weak and sometimes as infrequent as 40 beats to the minute.

Hydrocyanic ac.: Irregular beat of the heart, with slow depressed pulse. Pulse weak and slow. Pulse slow and scarcely perceptible.

Hyoscyamus: Slow and small.

Iberis: Pulse 70, intermittent, irregular, thin and wiry. Pulse 62, regular, but very easily compressed.

Jaborandi: At the moment the sweat was produced, there was an increase of pulse and temperature; then, during the period of active sweating, it was sometimes noted that these two elements remained at the same point as at the outset of the experiment; sometimes there was a slight diminution; but after sweating a notable diminution of the pulse and of the temperature were observed, which sometimes lasted two days after the experiment (in 32 experiments).

Juniperus virg.: Pulse less than 60, afterwards sank to 45, then intermitted. Pulse 55; after an hour it began to rise in frequency, became more regular, narrow, normal and firm. Pulse fluttering, feeble and slow, not more than 55 in a minute, and very irregular.

Ignatia: Small and slow.

Kali brom.: Action of the heart slow and fluttering. Accelerated heart, after a while it was at times several beats slower than natural. Pulse slower, except during actual vomiting. Small and slow pulse. Pulse weak and slow.

Kali cyan.: Pulse 70, large, soft and compressible. Pulse small but distinct, 60 per minute. Pulse scarcely perceptible, slow and irregular.

Kali ferocy.: Lessens the action of the heart, diminishes the number of beats in a minute, and softening and lessen-

ing the volume of the pulse. A full dose of this substance will often reduce the number of pulsations in a well person 10 beats in a minute, in a few minutes after being taken.

Kali nitr.: pulse slow, small and weak. Pulse very weak, small and thready at 60.

Kalmia: Slow, weak.

Lactuca: In some persons the pulse was reduced from 10 to 12 beats.

Leptandra: Slow and full.

Lobelia: Slower than usual.

Lycopus virg.: Intermittent character of cardiac pulsation, intermission at seventh, eighth, sixth, twenty-first, ninth, twenty-third and eighty-eighth, on waking, at 6.30 A.M., later the heart beats regular at 70.

Manganum acet.: Very uneven and irregular, sometimes rapid and sometimes soft and slow, but constantly soft and weak.

Mercurius: Slower by day; when slow it is weak and trembling.

Mercurius cyan.: Pulse small, slow and contracted. The pulse continued to sink constantly for twelve days, until it was only 52, after which it arose during the next week to 104.

Menyanthes: Pulse slow, 52.

Mezereum: Frequent in the morning, slow in the evening.

Naja trip.: Pulse 32, remarkably irregular both in rhythm and in force, some of the beats being strikingly full and bounding. Pulse weak and thready. Pulse hardly perceptible.

Nicotinum: Pulse and respiration very irregular, sometimes becoming very rapid, sometimes sinking.

Nitrum: Slow in the morning.

Oleander: Slow in the morning. (Hering.) Pulse weak and very slow. Intermissions every fourth or fifth beat. At one time rapid, at another very slow. Perceptible, violent and full, but slow pulsations in the carotids. (Gen. Lit.)

Opium: Full and slow, with snoring.

Paris: Full, but slow.

Petroleum: Slow during rest.

Physostigma: Pulse slow: feeble; thready; intermittent; 60 very small, wiry, but regular; strong and full; weak.

Pilocarpinum: In its primary effect it causes slight increase in the frequency of the pulse and diminution of the blood pressure, from small doses; after larger doses the pulse becomes slow, with great diminution of the blood pressure.

Plumbum: Variable; generally small and slow, contracted; at times hard and slow, sinks even to 40.

Pulsatilla: Slower in the morning.

Ranunculus bulb.: Slower in the morning.

Rhododendron: Slow and weak.

Sambucus: Occasional omissions of heart-beat; sometimes slow and full; sometimes intermitting.

Sarsaparilla: Slow in the morning.

Secale: Generally slow and contracted; at times intermittent and suppressed.

Scuttelaria: Pulse reduced to 64 per minute, at 10 P. M.

Sparteine: The pulse is at first slow, later becomes somewhat rapid, and still later slow again (in experiments on animals).

Spigelia: Strong, but slow.

Squilla: Small and slow, slightly hard.

Stigmata maidis: Renders heart's action slower and stronger.

Sterculia acuminata (Kola Nut): Under its action the heart's action is slowed and the sys-

tolic contractions become stronger.

Strophanthus: This drug physiologically slows the pulse and increases the ventricular power.

Strychninum: Pulse hard, full, slow, intermittent. Pulse 70, hard and contracted. Pulse small and slow.

Sumbul: Sinking of the heart, which beats softly, as if in water. The action of the heart full, and sharp strokes at times, irregular, beating rapidly 8 or 10 times, then slowly. Pulse 70, weak, low, irregular. Pulse 52 to 56, compressible, very irregular.

Tabacum: Beat of the heart weak, slow and intermittent. Pulse full, slow. Pulse slightly compressible and perfectly regular at barely 60. Pulse irregular, variable and intermittent, at one time 136 per minute, and in a short time thereafter down to 38 per minute. Pulse slow, 45. Pulse remarkably slow, scarcely perceptible, intermittent for fifteen seconds. (Allen.) Exceedingly slow. (Hering.)

Tanacetum: Pulse 68, with a peculiar beat.

Tarantula: The circulation of the blood, judging by the pulse, is alternately increased and diminished.

Terebinthina: Pulse from 65 to 86.

Thea: Pulse altered both in frequency and in strength; in some cases it is weak and slow, in others fluttering or intermitting; this state of depression of the circulating system occasionally becomes alarming.

Thuya: Slow and weak in the morning.

Valeriana: The pulse at first fell 10 beats, but subsequently rose higher than the former. Pulse unequal; in one minute 60, and in the next 90.

Veratrum alb.: Slow, soft, intermittent; sometimes slower than heart-beat.

Veratrum vir.: Slow, soft and weak.

Zincum: Slow in the morning; increased by wine.

Pulse Characters.

Large: Cupr. ac., Kali cyan., Bellad.

Small: Aconitine, Acon. cam., Acon. fer., Agar., Amygd. am., Ascl. tub., Cicuta vir., Digit., Helon., Hyosc., Ignat., Kali brom., Kali cyan., Kali nitr., Merc. cyan., Plumbum, Physos., Strychnin., Squilla.

Strong: Amygd. am., Physos., Spigel.

Weak: Aconitine, Acon. cam., Acon. fer., Crot. hor., Helon., Kali brom., Kali nit., Kalmia, Naja trip., Oleand., Physos., Rhodod., Sumbul, Tabac., Thea, Ver. alb., Kalmia.

Hard: Cepa, Plumbum, Squilla, Strychnin.

Soft: Kali cyan., Kali fer., Mang. ac., Ver. alb., Ver. vir.

Constantly soft and weak: Mang. ac.

Full: Amygd. am., Ananth., Bellad., Cicuta vir., Colchic., Gelsem., Naja trip., Opium, Physos., Sambuc., Strychnin., Sumbul, Tabac.

With snoring: Opium.

Feeble: Aconitine, Canthar., Colchic., Gelsem., Junip. vir., Physos.

Faint: Baptis.

Regular: Amygd. am., Chin. sulph., Iber., Physos., Tabac.

Irregular: Acon. cam., Agar., Bufo, Digit., Erythroph., Hydr. ac., Iber., Junip. virg., Kali cyan., Naja trip., Sumbul, Tabac.

Intermittent: Aconitine, Amygd.

am, Benz. ac., Bufo, Canthar., Capsic., Cupr. ac., Iber., Junip. virg., Lyc. virg., Oleand., Physos., Sambuc., Secale, Strychnin., Tabac., Thea.
Occasional omission of heart-beat: Sambuc.
Variable: Plumbum, Tabac.
Low: Crot. hor., Sumbul.
Unequal: Valer.
Vibrating: Amygd. am.
Wiry: Iber., Physos.
Thin: Iber.
Difficult to count: Aconitine.
Depressed: Hydr. ac.
Bounding: Naja trip.
Almost imperceptible: Aconitine, Aconitum cam., Acon., Canthar., Chin. sulph., Helon., Hydr. ac., Kali cyan., Naja trip., Tabac.
Flickering: Amygd. am.
Fluttering: Junip. virg., Thea.
Easily compressed: Iber.
Slightly compressed: Tabac.
Compressible: Kali cyan., Sumbul.
Changeable: Ant. crud.
Contracted: Merc. cyan., Plumbum, Secale, Strychnin.
Thread-like: Acon.
Thready: Kali nitr., Naja trip., Physos.
Suppressed: Secale.
Unusually slow: Apoc., Cann. ind., Digit., Plumbum, Tabac.
Forty-five between attacks of vomiting: Apoc.
As low as 46: Cann. ind.
Sinks even to 40: Plumbum.

General Symptoms.

With anxiety: Acon.
At first accelerated: Baptis.
Occasional omission of the heart-beat: Sambuc.
At times frequent, at others slow: Cactus, Mang. ac.
Pulse often slower than the beating of the heart: Helleb., Verat. alb.
Constantly soft and weak: Mang. ac.
Changing from slow to rapid every few beats: Ant. crud.
Pulse remarkably slow, scarcely perceptible, and intermitting for fifteen seconds: Tabac.
Pulse very feeble in carotid and radial arteries: Amygd. am.
After sweating a notable diminution of the pulse and of temperature was observed: Jabor.
Action of the heart slow and fluttering: Kali brom.
Pulse slower, except during actual vomiting: Kali brom.
In some persons the pulse was reduced from 10 to 12 beats: Lactuca.
Pulse 32, remarkably irregular, both in rhythm and in force, some of the beats being strikingly full and bounding: Naja trip.
Pulse and respiration very irregular: Nicotin.
Sinking of the heart, which beats softly as if in water: Sumbul.
Pulse 60, with a peculiar measured beat: Tanac.

Aggravations.

Slower in the morning: Arg. met., Nitrum, Lyc. virg., Oleand., Pulsat., Ran. bulb., Sarsap., Scuttel., Thuya.
And weak: Thuya.
Intermitting: Lycop.
Afternoon: Aloes.
Day: Mercur., Mur. ac.
Day and evening: Mezer.
Frequent in the morning, slower in the evening: Mezer.
At rest: Digit., Petrol.
When alone (weak and trembling): Mercur.

Amelioration.

Better from sweating: Jabor.

INCREASED CARDIAC ACTION AND PULSE-RATE.

Rapid Pulse: Aconitine, Acon. cam., Acon. fer., Acet. ac, Acon., Actea, Adonis ver., Æsc. hip., Æthusa, Agar., Aloes, Ailanth., Amyl. nit, Amygd. am., Ananth., Ambra, Amm. carb., Amm. mur., Anac., Ant. crud., Ant. tart., Apis, Arg. met., Arg. nitr., Arnica, Arsen., Arum, Ascl. tub., Asaf., Asar., Atrop., Aspar., Aurum, Bar. ac., Baptis., Bellad., Benz. ac., Borax, Bovista, Brom., Bryon., Bufo, Cactus, Caffeine, Calad., Calcar., Cann. ind., Cann. sat., Capsic., Carb. an., Caustic., Cepa, Chin. ars., Chin. sulph., Chelid., Chloral., Cina, Cinchon., Clemat., Coca, Coccul., Conval., Coffea, Colchic., Coloc., Crocus, Crot. tigl., Cuprum, Cupr. ac., Cyclam., Digit., Dulcam., Eupat. purp., Ferrum, Fluor. ac., Gelsem., Glonoin., Graphit., Guajac., Hellon., Hydr. ac., Hepar., Hyosc., Hyper., Iber., Ignat., Iodum, Ipec., Jabor., Jatropha, Junip. virg., Kali bichr., Kali brom., Kali chlor., Kali nitr., Kali carb., Kali jod., Kreos., Laches., Lachnan., Lactuca, Lauroc., Lobel., Lycop., Maté, Magn. mur., Mancin., Mang. ac., Mercur., Merc. cyan., Mezer., Millef., Mur. ac., Natr. carb., Natr. mur., Nitr. ac., Nux mosch., Oleand., Opium, Oxal. ac., Phosph. ac., Pilocarp., Platin., Plumbum, Pulsat., Physos., Ran. bulb., Ran. scel., Rheum, Rhus tox., Rhus ven., Ruta, Sabina, Sambuc., Sanguin., Sapon. Sarsap., Secale, Sparteine, Spongia, Stannum, Staphis., Stramon., Strychnin., Sulphur, Sulph. ac., Sumbul, Tabac., Tanac., Tarant., Thea, Tereb., Valer., Ver. alb., Ver. vir., Zincum.

Acetic ac.: Ninety-six, full and regular, small, contracted.

Aconitine: Pulse at first, on entering a warm room, more frequent, then sinks far below normal, is small, weak and intermittent.

Aconite: Hard, strong, contracted.

Aconitum cam.: Pulse frequent, afterwards depressed.

Aconitum fer.: Pulse 70, small and weak.

Adonis ver.: An increase in the number of pulse-beats occurs as a secondary effect of this drug in dogs. Small doses appear to increase the force and frequency of the pulse primarily.

Actea rac.: Weak and irregular.

Æsculus: Full, heavy, soft, weak.

Æthusa: Small, sometimes hard, unrhythmical.

Agaricus: Violent; strongly felt.

Ailanthus: Small, weak, sometimes scarcely perceptible; very frequent and irregular.

Aloes: Strong beat of the heart occasionally.

Alumina: Irregular; large and small beats intermixed.

Ammonium carb.: Hard, tense.

Amydalæ am. aq.: Pulse at first small, frequent and intermittent, then slow and regular. Pulse 100, 130, 140; very small, thready.

Amyl nit.: Increased cardiac pulsation. The pulse-beats often rose from 70 to the rate of 160 per minute in a few seconds, quickly subsiding again as the drug was left off, but nearly always remaining somewhat irregular. Pulse at first slow and very strong; afterwards quicker and jerk-

ing. Pulse 136, regular. Pulse 80, very irregular.

Anantherum: Pulse slow and full, then accelerated, hard and dicrotic.

Antimonium crud.: Extremely irregular; now accelerated, again slow, changing every few beats.

Antimonium tart.: Hard; rapid, weak and trembling; small, contracted.

Apis: Hard, small; full and strong.

Arnica: Full, hard.

Arsenicum: Small; weak.

Asafœtida: Accelerated, but small.

Asarum: Strong.

Asclepias tub.: Pulse rose from 64 to 88.

Atropinum: Weak doses accelerate the heart and increase blood pressure; poisonous doses have the reverse effect. Pulse accelerated, increased in volume and power; just as the pulse rises a slight giddiness is often perceptible. Pulse 150, small and weak. Pulse accelerated to 140, with increased tone, but diminished volume. Pulse 112, lying down. Pulse 104; regular, not full, easily compressed; the single pulsations not sharply defined. Pulse 96, full and soft.

Asparagus: Pulse slightly accelerated. Pulse accelerated when sitting.

Aurum: Small.

Baptisia: Acceleration, afterwards slow and faint; compass and frequency of the heart's pulsations seem increased.

Baryta ac.: Pulse 125–130, very small and very frequent.

Belladonna: Full, hard, tense.

Benzoic ac.: Intermittent.

Bryonia: Full, hard, rapid and tense; at times intermittent; violent.

Bufo: The heart-beats are sometimes quick, sometimes slow; intermittent or irregular. Hard, frequent, irregular pulse, much quicker and more agitated evenings than mornings.

Cactus: At times frequent.

Caffeine: First accelerates, then slows the pulse-rate.

Caladium: Hard, bounding (intermittent).

Calcarea: Full, often tremulous.

Cannabis ind.: As high as 160.

Cantharis: Hard, full; small.

Capsicum: Full, strong.

Cepa: Frequent and full.

Chamomilla: Small, but tense.

Chelidonium: Small and quick; full and hard.

Chininum ars.: The heart began to tremble, with a rumbling noise, and I was unable to distingush the pulsations; this lasted one hour, after which the beat of the heart and pulse (the latter could not be felt on the left side) became irregular, and numbered 200 per minute (soon after 8 o'clock, morning after triturating), the beat of the heart became regular towards noon; pulse felt in the temple and at radial artery, 200 (pulse usually 76).

Chininum sulph.: Pulsations of the heart, conscious, slightly accelerated, in the forenoon. Pulse rapid, full. Pulse rapid, neither hard nor full. Pulse varied from 75 to 94. Pulse 100 at 3 P.M.

Chloralum: Pulse becomes more frequent, and perspiration breaks out.

Cicuta vir.: Pulse 90.

Cina: Small, but hard.

Cinchona: Small, hard.

Coca: Pulse increased from 70 to 134, with this also a peculiar noise in the ears.

Cocculus: Small, spasmodic, seldom hard, often imperceptible.

Coffea: More frequent, but less

vigorous; even small and weak.

Colchicum: Hard, thready.

Colocynthis: Full hard.

Convallaria maj.: The heart is at first slowed, but afterwards becomes accelerated.

Croton tigl.: Pulse rapid and weak. Pulse so weak and quick it could not be counted. Pulse 150 and very weak.

Crocus: Feverish.

Crotalus hor.: Pulse at first full, hard and rapid, then weak and slow. Pulse 100, with cold skin. Pulse 130, small, in the evening.

Cuprum: Small, hard, moderately frequent.

Cuprum ac.: Pulse quick, and at the same time so small and weak and thready as scarcely to be felt. Pulse small, rapid, spasmodic. Pulse hard, full and frequent. Pulse moderately accelerated.

Cyclamen: very rapid; scarcely perceptible.

Digitalis: the slightest motion makes the pulse immediately more rapid. (Allen.) Violent, but not very rapid; full and hard from every motion. (Hering.)

Dulcamara: Pulse accelerated, moderately full. Pulse, small, very rapid. Frequent, irregular pulse.

Eupatorium purp.: Full.

Ferrum: Full, hard.

Fluoric ac.: Small.

Gelsemium: Excessive action of heart; soft, weak, almost imperceptible

Glonoinum: Rises and falls alternately.

Graphites: Full, hard.

Guajacum: Small, soft.

Helleborus: Soft.

Hellonias: The pulse ranges at 84, full and a little irregular in the evening.

Hepar: Hard, full; at times intermitting.

Hydrocyanic ac.: Beat of the heart and pulse variable, sometimes frequent, sometimes intermitting, also weak. Pulse more rapid, but smaller and unequal in force, a weak impulse alternating with a strong one. Pulse slightly increased in rapidity, smaller and unequal, so that after every six or seven beats there were one or two stronger and longer waves of the artery. Pulse 100, very small, feeble, yet regular.

Hyoscyamus: Full, hard, strong.

Hypericum: Hard.

Iberis: Pulse 92, wavy, tremulous, easily compressed, intermits at every third beat. Pulse 98, wavy, tremulous, slightly intermits every fourth or fifth beat. Pulse 100, with peculiar double beats, which seemed to run into each other, full and easily compressed. Heart's action much increased, the force of the apex beat being well marked. Pulse rose from 70 to 90, hard and jerking, with an intermission every third beat.

Ignatia: Generally hard and full.

Iodum: Large, hard; rapid, but weak and thread-like.

Ipecacuanha: Weak; large and soft.

Jaborandi: Pulse considerably the quicker. At the moment sweat was produced, there was an increase of pulse and temperature; then during the period of active sweating, it was sometimes noticed that these two elements remained at the same point as at the outset of the experiment; sometimes there was a slight diminution; but, after sweating, a very no-

ticeable lowering of the pulse and of the temperature was observed, which sometimes lasted two days after the experiment (in 32 experiments). Pulse rose from 80 to 120.

Jatropha: Pulse 140 and weak. Pulse 87, large, full, almost jerking. Pulse 80, hard and throbbing.

Juniperus virg.: Pulse over 100.

Kali brom.: Accelerated heart, after a while it was several beats slower than natural. Pulse irritable and rapid. Pulse small and very frequent.

Kali chlor.: Pulse accelerated.

Kali nitr.: Pulse hard and rather frequent towards evening. Pulse small and rapid, with warm hands. Very weak, rapid pulse. Pulse full, and hard and rapid and a condition very like an inflammatory irritability of the whole body, but especially in the abdominal organs. Pulse very rapid, for an hour in the afternoon, while at rest. Pulse very rapid, at 4 P.M., with heat in the head for an hour.

Kreosotum: Weak and small; soft and trembling.

Lachesis: Small, weak; unequal; intermittent.

Lachnanthes: One hundred and ten, small, thin; hard (in pneumonia).

Lactuca: Rather frequent pulse.

Laurocerasus: While accelerated, seldom full and hard.

Lilium: Rapid beating, 160 to 170 per minute.

Lobelia: Small, weak.

Maté: The sphygmographic tracings show an accelerated action of the heart, wider oscillations and diminished arterial tension. Considerable acceleration of pulse.

Mancinella: Weak.

Manganum ac.: Sometimes rapid.

Mercurius: Full.

Mercurius cyan.: Pulse weak, 130. Pulse 90, stronger and more frequent. The pulse continued to sink constantly for twelve days, until it was only 52, after which it rose during the next week to 104.

Mezereum: Full, hard.

Millefolium: Contracted.

Naja trip.: Pulse 120, regular in rhythm, but unequal in force, most of the beats, however, being tolerably full and strong.

Natrum mur.: Weak and rapid.

Nicotinum: Pulse increased in frequency in direct proportion to the dose. Pulse and respiration very irregular, sometimes becoming very rapid, sometimes sinking.

Nitric ac.: Alternate hard, rapid and small beats.

Nux vom.: Hard, full, small.

Oleander: Quick pulse, sinking to a thread.

Opium: Hard.

Phosphorus: Full and hard; small and weak.

Physostigma: Woke about 2 A.M., with a rapid, tumultuous action of the heart as in high fever; but there was no unusual heat. Pulse accelerated.

Pilocarpinum: Slight acceleration of the pulse from 5 to 10 beats during the perspiration. In its primary effect it causes slight increase in the frequency of the pulse and slight diminution of the blood pressure, from small doses; after larger doses the pulse becomes slow, with great diminution of the blood pressure. Symptoms of relaxed tone of the bloodvessels and accelerated heart's action. Increased frequency of the pulse by 10 to 20 beats, coincident

with or a little later than the salivation. After the perspiration the pulse falls and gradually sinks to the normal.

Platina: Regular, but small and weak; sometimes tremulous.

Plumbum: Small.

Pulsatilla: Small and weak.

Ranunculus bulb.: Full, hard.

Ranunculus scel.: Full, but soft.

Rheum: Only a little accelerated.

Rhus: Weak, faint, soft, trembling or imperceptible.

Rhus ven.: During the first five days my pulses were increased from 10 to 20 strokes in the minute. Pulse 78, regular.

Ruta: Somewhat accelerated, only during heat.

Sabina: Generally quick, strong and hard, sometimes unequal.

Sambucus: Generally very frequent and strong.

Sanguinaria: Hard, small, quick.

Saponinum: Pulse 93, 104. Pulse went from 70 to 90; remained in high fever for four hours.

Secale: During the heat.

Silica: Small, hard.

Sparteine: The pulse is at first slow, and afterward somewhat rapid, again becoming slow (in experiments on animals).

Spongia: Hard, full or feeble.

Stannum: Small.

Staphisagria: Small, often trembling.

Stramonium: Full, strong, hard.

Strychninum: Pulse 88 and regular. Pulse regular, about 90 (between the spasm). Pulse weak and rapid. Pulse very rapid, small. Pulse very rapid and easily compressed. Pulse more rapid than usual between the spasms. Pulse about 150. Pulse frequent (about 130) but soft. Pulse 120, small, regular and corded, or tense and strong. Pulse 140 during spasm. Pulse 96, rather small and very irregular. Pulse weak, rapid and almost imperceptible. Pulse small, suppressed and rapid. It was impossible to count the pulse during the convulsions, and it was very little more than a flutter during the interval, the slightest touch throwing the patient into a paroxysm. Radial pulse imperceptible during the spasm; in the intervals of rest, 110; at the close of each fit, 128.

Sulphur: Full, hard, at times intermittent.

Sulphuric ac: Small, feeble.

Sumbul: The action of the heart full, and sharp strokes at times, irregular, beating rapidly 8 or 10 times, then slowly. Accelerated, full pulse. Pulse 90, strong in the evening.

Tabacum: Full, quick, large; imperceptible, small, intermittent (Hering). Pulse rapid. Pulse small and very frequent. Pulse rapid and irregular. Pulse 92, full, hard, rapid. Pulse small, hard, rapid. Pulse irregular, variable and intermittent, at one time 136 per minute, and in a short time thereafter down to 38 per minute (Allen).

Tanacetum: Pulse 110, small and feeble; almost extinct. Pulse 98. Pulse decidedly increased in force and a little in frequency. Pulse quite full, forcible, 128.

Tarantula: The circulation of the blood, judging by the pulse, is alternately increased and diminished. Hard and frequent pulse.

Terebinthina: Hard, rapid pulse. Pulse rapid and weak. Pulse and respiration quickened. Pulse quick, small, compressible and almost imperceptible, but regular. Pulse 65 to 86.

Small, hard, 82; small, irregular, 86; small, weak, 92.

Thea: Pulse rapid, irregular and often intermitting. Pulse at first accelerated, afterward diminished, irregular, and even intermittent. Pulse expanded, 120. Pulse full and quick. Pulse 92, then 84, then 80.

Thuya: In the evening, violent pulsations.

Terebinthina: Feeble, rapid.

Valeriana: Sometimes tense, or small and weak (Hering). Pulse 90. The pulse is somewhat accelerated and irregular, two or three beats being occasionally quicker than the others; at the same time it was more tense. Pulse 85 at 10 A.M. Pulse 78, the beat of the heart being weak and scarcely felt. The pulse at first fell 10 beats, but subsequently rose higher than the former. Pulse 69 (before experiment), rose to 75, where it remained for some hours; associated with rush of blood to the head, feeling of fulness and increased warmth of the face. Pulse frequent, tremulous and irregular. Pulse unequal, in one minute 60, and in the next 90 (Allen).

Veratrum: Frequent, small, hard.

Veratrum vir.: Suddenly increases and gradually decreases below normal.

Zincum: Irregular, or small and frequent, evenings.

Pulse Characters.

Regular: Acet. ac., Amyl. nitr., Atrop., Hydr. ac., Naja trip., Rhus ven., Strychnin., Tereb.
Not full: Atrop.
Between the spasms: Strychnin.

Irregular: Actea rac., Alum, Amyl. nitr., Bufo, Chin. sulph., Dulcam., Hellon., Strychnin., Sumbul, Tabac., Tereb., Thea, Valer.

Intermittent: Amygd. am., Benz. ac., Bryon., Bufo, Helleb., Hepar, Hydr. ac., Iber., Laches., Sulphur., Tabac., Thea.
Third, fourth or fifth beat: Iber.
With orgasm of blood: Bryon.
In hydrocephaloid: Helleb.
At times: Hepar.

Large: Alum., Iodum, Ipec., Jatroph., Tabac.

Small: Acon. fer., Æthusa, Ailanth., Alum., Amygd. am., Ant. tart., Arsen., Asaf., Atrop., Aurum, Bar. ac., Canthar., Chamom., Chelid., Cinchon., Coccul., Crotal., Cuprum, Cupr. ac., Dulcam., Fluor. ac., Guajac., Hydr. ac., Ipec., Kali brom., Kali nitr., Kreos., Laches., Lobel., Nitr. ac., Platin., Pulsat., Sambuc., Strychnin., Sulph. ac., Tabac., Tanac., Tereb., Valer., Zincum.

Full: Acet. ac., Æscul., Apis, Arnica, Atrop., Baptis., Bellad., Bryon., Calcar., Canthar., Capsic., Cepa, Chin. ars., Coloc., Crotal., Cuprum, Digit., Dulcam., Eupat. purp., Ferrum, Graphit., Helleb., Hepar., Hyosc., Kali nitr., Iber., Jatropha, Laches., Mercur., Mezer., Naja trip., Nux vom., Oleand., Phosphor., Ran. scel., Spongia, Stramon., Sulphur, Sumbul, Tabac., Tanac., Thea.
Often tremulous: Calcar.
Seldom full: Lauroc.

Weak: Acon. fer., Æsc. hipp., Actea, Ailanth., Ant. tart., Arsen., Atrop., Crot. tigl., Cupr. ac., Coffea, Gelsem., Hydr. ac., Ipec., Jatropha, Kali nitr., Kreos., Laches., Lobel., Mancin., Merc. cyan., Natr. mur., Phosph. ac., Rhus, Strychnin., Tereb., Valer.
In the evening: Lobel.

Strong: Acon., Apis, Asar., Bap-

tis., Benz. ac., Capsic., Merc. cyan., Naja trip., Phosph. ac., Stramon., Strychnin., Sumbul.

Soft: Æscul., Atrop., Cupr. ac., Gelsem., Guajac., Helleb., Ipec., Mang. ac., Ran. scel., Rhus, Strychnin.

Hard: Acon., Æthusa, Ananth., Amm. carb., Ant. tart., Apis, Arnica, Bellad., Bryon., Bufo, Canthar., Calad., Chelid., Cina, Cinchon., Colchic., Crot. hor., Cuprum, Cupr. ac., Digit., Ferrum, Graphit., Hepar, Hyosc., Iber., Ignat., Iodum, Jatropha, Kali nitr., Lachnanth., Mezer., Nitr. ac., Nux vom., Opium, Phosphor., Ran. bulb., Sabina, Sanguin., Silica, Stramon., Tabac., Tarant., Tereb., Ver. alb.

With anxious breathing: Opium.

Seldom hard: Coccul.

Seldom full and hard: Lauroc.

Hurried: Arnica.

Contracted: Acet. ac., Acon., Ant. tart., Cupr. ac., Millef.

Spasmodic: Cann. ind., Cupr. ac.

Thready: Amygd. am., Colchic., Cupr. ac.

Thin: Lachnanth.

Thread-like: Arsen., Iodum.

Double beat: Agar., Cyclam., Phosphor.

Unrhythmical: Æthusa.

Heavy: Æscul.

Almost imperceptible: Cyclam., Ox. ac., Arsen., Gelsem., Rhus, Strychnin., Tereb.

Or trembling: Rhus.

With deadly coldness, clammy sweats, livid nails: Ox. ac.

Variable: Hydr. ac., Tabac.

Fluttering: Junip. virg., Thea.

Compressible: Kali cyan., Sumbul., Tereb.

Slightly compressible: Tabac.

Easily compressed: Atrop., Iber., Strychnin.

The single pulsations not sharply defined: Atrop.

Scarcely to be felt: Cup. ac., Valer.

Irritable: Kali brom.

Unequal: Hydr. ac., Naja trip.

Wavy: Iber.

Feeble: Hydr. ac., Tanac., Valer.

Throbbing: Jathropha.

Wiry: Iber., Physos.

Flickering: Amygd. am.

Suppressed: Strychnin.

Almost extinct: Tanac.

Forcible: Tanac.

Expanded: Thea.

Sinking to a thread: Oleand.

Depressed: Acon. cam.

Dicrotic: Ananth.

Jerking: Amyl nitr., Iber.

Almost jerking: Jatropha.

Agitated: Bufo.

Tense: Strychnin., Valer.

Corded: Strychnin.

Tremulous: Calcar., Iber., Platin., Valer.

Trembling: Ant. tart., Kreos., Nux mosch., Rhus, Staphis.

Excited: Caustic., Clemat.

Violent: Bryon., Nux mosch., Digit.

Increased in force and frequency: Tereb.

Alternately full and small: Acon., Laches.

Quicker than beat of the heart: Arnica, Rhus.

Bounding (in intermittents): Calad.

Rises and falls alternately: Glonoin.

Alternately hard, rapid and small beats: Nitr. ac.

Large and small beats intermixed: Alum.

Changing from slow to rapid every few beats: Ant. carb.

Suddenly increases and gradually decreases below normal: Ver. vir.

Noticing the beat of the heart increases it: Arg. nitr.

Generally hard and full: Ignat.

Constantly soft and weak: Mang. ac.

Heart beats more strongly and rapidly when lying on the back: Arsen.

Concomitants.

With orgasms, ebullitions, etc.: Æscul., Agar., Ambra, Anac., Benz. ac., Bryon., Carb. an., Caustic., Clemat., Ignat., Magn. mur., Mercur., Natr. carb., Oleand., Pulsat., Ver. vir.

Felt all over the body: Æscul.

Strongly felt: Agar.

Beating in the bloodvessels: Anac.

Heart's pulsations seem to fill the chest: Baptis.

Internal but no external heat; cannot go to sleep: Benz. ac.

Strong orgasm of blood: Bryon.

Beating in the bloodvessels: Carb. an., Iodum.

Towards evening: Caustic.

Throbbing in the veins: Clemat.

With throbbing in the bloodvessels: Ignat.

With distended bloodvessels: Pulsat.

At night with excited pulse: Natr. carb.

While sitting: Magn. mur.

With giddiness: Atrop.

With a peculiar noise in the ears: Coca.

With cold skin: Crot. hor.

With nausea: Arg. nitr.

With rush of blood to the head: Valer.

With a feeling of fulness and increased warmth of the face: Valer.

With asthma: Arg. nitr.

With warm hands: Kali nitr.

With a condition very like an inflammatory irritability of the whole body, especially in the abdominal organs: Kali nitr.

General Symptoms.

Pulse 100, with peculiar double beats, which seemed to run into each other: Iber.

After sweating, a very noticeable lowering of the pulse and temperature: Jabor.

Wider pulse oscillations and diminished arterial tension: Maté.

Pulse regular in rhythm, but unequal in force: Naja trip.

Pulse increased in frequency in direct proportion to the dose: Nicot.

Pulse and respiration very irregular: Nicot.

Woke about 2 A.M., with a rapid, tumultuous action of the heart, as in high fever, but there was no unusual heat: Physos.

Slight acceleration of the pulse from 5 to 10 beats during the perspiration: Pilocarp.

Slight diminution of blood pressure from small doses; great diminution from large doses: Pilocarp.

Pulse increased coincident with or a little later than the salivation: Pilocarp.

Pulse at first, on entering a warm room, accelerated, then sinks far below normal: Aconitine.

Pulse at first small, frequent and intermittent, then slow and regular: Amygd. am.

Pulse at first slow and very strong; afterwards quicker and jerking: Amyl nitr.

Pulse slow and full, then accelerated, hard and dicrotic: Ananth.

Just as the pulse rises a slight giddiness is often perceptible: Atrop.

Weak doses accelerate the heart and increase blood pressure; poisonous doses have the reverse effect: Atrop.

Pulse 140, increased tone, but diminished volume: Atrop.

The heart-beats are sometimes quick and sometimes slow: Bufo.

Pulse 200, felt in the temples and radial arteries: Chin. ars.

The heart began to tremble, with a rumbling noise, and I was unable to distinguish the pulsations: Chin. ars.

Pulse becomes more frequent and perspiration breaks out: Chloral.

Pulse so weak and quick it could not be counted: Crot. tigl.

The slightest motion makes the pulse immediately more rapid: Digit.

A weak impulse alternates with a strong one: Hydr. ac.

Pulse smaller and unequal, so that after every six or seven beats there were one or two stronger and longer waves of the radial artery: Hydr. ac.

Pulse unequal, in one minute 60 and in the next 90: Valer.

Pulse 69 (before experiment), rose to 75: Valer.

After the perspiration the pulse falls and gradually sinks to the normal: Pilocarp.

During the first five days my pulses were increased from 10 to 20 strokes per minute: Rhus ven.

Pulse more rapid than usual between the spasms: Strychnin.

It was impossible to count the pulse during the convulsions: Strychnin.

Radial impulse imperceptible during the spasm: Strychnin.

Pulse irregular, variable and intermittent, at one time 136 per minute, and in a short time thereafter down to 38 per minute: Tabac.

Pulse decidedly increased in force and a little in frequency: Tanac.

The circulation of the blood, judging by the pulse, is alternately increased and diminished: Tarant.

Pulse and respiration quickened: Tereb.

Pulse at first accelerated, afterwards diminished, irregular and even intermittent: Thea.

The pulse at first fell 10 beats, but subsequently rose higher than the former: Valer.

Aggravations.

Morning: Chin. ars., Chin. sulph., Graphit., Mezer., Kali carb.
Rapid, mornings; slow, evenings: Mezer., Kali carb.

Afternoon: Nitrum, Kali nitr.

Evening: Argent., Arg. nitr., Bufo, Capsic., Carb. an., Caustic., Chelid., Crot. hor., Helon., Graphit., Lobel., Mur. ac., Natr. carb., Nitrum, Oleand., Pulsat., Ran. bulb., Rheum, Sarsap., Sumbul, Thuya, Zincum.
In bed: Argent.
With hot skin: Oleand.
Toward evening: Kali nitr.
Slow, mornings; rapid, evenings: Sarsap.

Night: Arsen., Benz. ac., Kali bichr., Dulcam., Mercur., Ran. scel.
Awakens suddenly with a start at 2 A.M.: Kali bichr.
Awakens after midnight with violent pulsations of heart: Benz. ac.
After midnight (2 A.M.): Physos.
Slow during the day: Mercur., Mur. ac.

During heat: Secale, Ruta.
Only during heat: Ruta.

After eating: Camphora, Nux vom., Lycop.

By motion: Digit., Glonoin., Petrol., Arg. nitr.

At rest: Kali nitr.

By exertion: Arg. nitr., Ferrum, Iodum.

By walking: Glonoin.

By mental emotion: Arg. nitr., Nux vom.

From protracted study: Nux vom.

On entering a warm room: Aconitine.
When sitting: Aspar.
When lying down: Atrop.
From touch: Strychnin. (brings on spasms).
From salivation: Pilocarp.
From sweating: Jabor., Pilocarp.
During spasm, and much worse afterwards: Strychnin.
Affected by alcohol: Rhus, Sulph. ac.
Affected by wine: Zincum, Nux mosch.
Affected by beer: Rhus.
After spices: Nux vom.
Affected by coffee: Nux vom., Rhus.

AMELIORATIONS.

More quiet after meals: Cinchon.
After perspiration: Pilocarp.
Towards noon: Chin. sulph.

EBULLITIONS, ORGASMS, ETC.

Abrot., Acon., Anac., Bar. carb., Calcar., Coloc., Ferr. mur., Graphit., Kreos., Lachnanth., Lil. tigr., Lycop., Mercur., Millef., Naja trip., Natr. mur., Petrol., Plumbum, Physos., Sabina, Sambuc., Sarsap., Sumbul, Valer., Ver. vir., Zincum.

Abrotanum: With general heat and distended veins on the forehead.

Aconite: Burning flushes along the back; oppression about the heart; anxiety; difficulty of breathing; flying heat in the face; sensation of something rushing into the head.

Anacardium: Beating in the bloodvessels.

Baryta carb.: Orgasm of blood, with anxiety.

Calcarea: Much beating in the bloodvessels.

Colocynth.: Strong throbbing in all the bloodvessels.

Ferrum: Throbbing in all bloodvessels; soft bellows' sound at apex.

Graphites: Strong pulsation of the blood in the whole body, but especially about the heart, increased by every motion.

Kreosotum: Pulsation in all the arteries when at rest.

Lachnanthes: While lying feels the beating of his heart to his head.

Lilium: Conscious pulsations over the whole body and outpressing in hands and arms; as if the blood would burst through the vessels.

Lycopodium: Sensation as if the circulation stood still, or ebullitions.

Mercurius: Orgasm, with trembling from slight exertion.

Millefolium: Ebullitions from coughing blood.

Natrum mur.: Heart's pulsations shake the body.

Naja trip.: Heat and uneasy about the heart towards evening.

Petroleum: Fainting, with ebullitions; heat; pressing on the heart and palpitation.

Plumbum: Rush of blood to the heart during a rapid walk.

Physostigma: Uneasiness and distress about the heart, mostly without violent palpitation, but with a fulness and pulsation over the body, so that I counted the pulse, 72, by the ear; this uneasiness is prin-

cipally at night, causing restlessness, tossing from one side to the other, with dry heat all over. Woke about 2 A.M., with a rapid, tumultuous action of the heart, as if in high fever, but there was no unusual heat. Sometimes it seems to me as if I could hear every artery in my body beat. While sitting still he felt a pulsation through the whole body, particularly in the chest, each beat of the heart was distinctly perceptible in the chest and temples.

Sabina: Violent beating in bloodvessels in whole body.

Sambucus: Orgasm in whole body.

Sarsaparilla: Ebullitions of blood and protruding veins.

Sumbul: Palpitation of the heart with transient flushes of heat. Flushes of heat in floods from the back.

Valeriana: In the first quarter of an hour the beats are full and vigorous, in the second the diastole is shorter, the whole body being agreeably warm, and a tremulous, anxious sensation being experienced, which seems to come out of the abdomen. Pulse 69 (before experiment), rose to 75, where it remained for some hours, associated with rush of blood to the head and increased warmth of the face.

Veratrum vir.: Loud, strong, with great arterial excitement.

Zincum: Violent pulsations in bloodvessels during heat.

Concomitants.

With anxiety: Acon., Baryta.

With anguish: Plumbum.

With fainting: Petrol.

With trembling: Mercur.

With palpitation: Petrol., Sumbul.

And transient flushes of heat: Sumbul.

Mostly without violent palpitation: Physos.

With uneasiness about the heart: Naja trip.

With uneasiness and distress about the heart: Physos.

With restlessness, tossing from one side to the other: Physos.

With pulsation: Physos.

With rush of blood to the head and increased warmth of the face: Valer.

With difficult breathing: Acon.

With cold sweat: Plumbum.

With great arterial excitement: Ver. vir.

With protruding veins: Abrot., Sarsap.

And distended veins on forehead and hands: Abrot.

With heat: Abrot., Petrol., Physos.

Dry heat all over: Physos.

With oppression about the heart: Acon., Petrol., Plumbum.

And palpitation: Petrol.

General Symptoms.

Rush of blood to the heart after a rapid walk; anguish, cold sweat: Plumbum.

Beating in the bloodvessels: Anac., Calcar.

Heat and uneasy about the heart towards evening: Naja trip.

Sometimes I feel as if I could hear every artery in my body beat: Physos.

I counted the pulse, 72, by the ear: Physos.

Each beat of the heart was distinctly perceptible in the chest and temples: Physos.

Felt particularly in the chest: Physos.

Flushes of heat in floods from the back: Sumbul.

Throbbing in all the bloodvessels: Coloc., Ferrum.

Pulsations in the vessels: Graphit., Kreos., Lil. tigr., Natr. mur., Zincum.

Felt especially about the heart, increased by every motion: Graphit.

Conscious pulsations over the whole body, and outpressing in hands and arms, as if the blood would burst through the vessels: Lil. tigr.

Heart's pulsations shake the body: Natr. mur.

Felt over the whole body: Graph., Lil. tigr., Natr. mur., Physos., Sabina, Sambuc.

Feels the beating of his heart to his head: Acon., Lachnanth.

While lying: Lachnanth.

Sensation of something rushing into his head, with flying heat in the face: Acon.

As if the blood would burst through the vessels: Lil. tigr.

Burning flushes along the back: Acon.

Sensation as if the circulation stood still, or ebullitions: Lycop.

AGGRAVATIONS.

Worse from motion: Graphit.
Slight exertion: Mercur.
When at rest: Kreos.
When lying: Lachnanth.
Rapid walking: Plumbum.
During heat: Zincum.
Coughing blood: Millef.
Worse evenings: Naja trip.
Worse at night: Physos. (uneasiness).
Worse after midnight: Physos.

PALPITATION.

Acon., Actea, Æscul., Æthusa, Agar., Alum., Ambra, Amm. carb., Ananth., Angust., Ant. crud., Ant. tart., Argent., Arg. nitr., Arnica, Arsen., Asaf., Aspar., Aurum, Bar. carb., Bellad., Benz. ac., Berber., Bovista, Bromin., Bufo, Cactus, Calcar., Calc. phosph., Camphora, Cann. ind., Canthar., Carb. an , Caustic., Chamom., Chelid., Chin. ars., Chin. sulph., Cicuta, Cinchona, Coca, Coccul., Coffea, Colchic., Conium, Crocus, Crot. tigl., Cuprum, Cupr. ac., Curare, Cyclam., Dulcam., Euphras., Ferrum, Graphit., Guajac., Hamam., Helleb., Hepar, Hydras., Hydr. ac., Iber., Ignat., Illic. anis., Iodum, Jatropha, Kali bichr., Kali carb., Kali cyan., Kali jod., Kali nitr., Kalmia, Laches., Lauroc., Ledum, Lilium, Lycop., Magn. mur., Mancin., Mang. ac., Mercur., Merc. cor., Merc. cyan., Millef., Mur. ac., Naja trip., Natr. carb., Nat. mur., Nitr. ac., Nitrum, Nux mosch., Nux vom., Oleand., Petrol., Phosphor., Phosph. ac., Physos., Platin., Podophy., Pulsat., Rhus tox., Rhus ven., Ruta, Sabina, Sanguin., Secale, Sepia, Silica, Spigel., Spongia, Staphis., Stramon., Strychnin., Sulphur., Sumbul, Sulph. ac., Tabac., Tarant., Tereb., Tellur., Thea, Thuja, Valer., Ver. alb., Ver. vir.

Aconite: With a feeling as if boiling water was poured into the chest.

Actea: Unconsciousness.

Æsculus: Heart's action full, heavy, can feel the pulsations all over the body. Darting in the region of the heart, with fulness and palpitation.

Æthusa: With vertigo and headache.

Agaricus: Violent, strongly felt, worse evenings; with redness of the face; on sitting down, some irregular, strong beats; anxious oppression.

Alumina: Awakens with palpitation; irregular, large and small beats intermixed.

Ambra: When walking in the open air, with paleness of the face. Violent, with pressure in chest as if a lump lay there, or as if the chest was stuffed up.

Ammonium carb.: Frequent, with contraction of epigastrium and a weak feeling in the pit of the stomach. Audible, with attacks of great anxiety, as if dying; cold sweat; involuntary flow of tears; unable to speak; loud, difficult breathing and trembling of hands.

Anantherum: Violent palpitation, with suffocative attacks, from the least emotion.

Angustura: Violent palpitation of the heart in the evening when lying on the left side in bed; better when sitting up. Violent palpitation of the heart when sitting or stooping, with a painful sensation as if the heart was constricted. Painful thrust in the region of the heart.

Antimonium crud.; Violent.

Argentum: Increased by sudden muscular exertion.

Argentum nitr.: With nausea, with asthma; violent, from slightest mental emotion or sudden muscular exertion.

Arnica: From almost any exertion; goes off by rest.

Arsenicum: After suppressed herpes or foot sweat, with small, irregular pulse; strong, visible and audible, chiefly at night. With anguish; cannot lie on back; increased by going up-stairs.

Asafœtida: Nervous, with small pulse, from overexertion or suppression of discharges (in women).

Asparagus: Palpitation of the heart while sitting, so that the leaves of the book which he held in his hand trembled. Palpitation of the heart, especially after motion. Palpitation of the heart, with anxious restlessness, increased by motion and going up-stairs. Palpitation of the heart occurred, with oppression of the chest.

Aurum: With great agony. When riding or walking, palpitation compels him to stop. With irregular, intermittent pulse and short breathing.

Baryta carb.: When lying on left side, with soreness in the region of the heart; great anxiety; renewed by thinking about it.

Belladonna: A kind of palpitation, with gurgling at the heart, when going up-stairs.

Benzoic ac.: While sitting; worse after drinking. Also worse at night, lying; at times tearing, rheumatic pains in the extremities, relieving the heart.

Berberis: Frequent.

Bovista: With tremor of hands. Visible palpitation after going up-stairs; as if the heart was working in water; after overexertion.

Bromium: Violent, in the evening, so that she cannot lie on the left side.

Bufo: Palpitation of the heart sounding in the ears like drumbeats.

Cactus: With vertigo, loss of consciousness; dyspnœa, worse walking, at night, lying on the left side, at the approach of the menses and from any exertion.

Calcarea: With anxiety, also at night, or after meals.

Calcarea phosph.: With anxiety, followed by trembling weakness, particularly of calves.

Camphora: Trembling palpitation, with anxiety. With sudden oppression of breathing; with cold face, limbs and body; with

pale face and cold body; after eating; after waking, with twitches.

Cannabis ind.: Awaking from sleep.

Cantharis: Violent.

Carbo an.: After eating; when singing in church; morning, on awaking, must lie still with eyes closed.

Chamomilla: And faintness.

Chininum ars.: Palpitation, noticed on leaning against the back.

Chininum sulph.: Woke on right side; palpitation; relieved by lying in abdominal position. Roused suddenly; palpitation; "had to lie on it," with hand supporting heart. After breakfast, sitting at stool, elbows on knees, palpitation, felt through chest, down back to sacrum, and through abdomen. Owing to indignation, in the morning, palpitation of the heart, better lying on it, alternating with change of position, stretching, etc. Woke in the morning with slight yet notable palpitation of the heart, ceasing on lying fairly upon it.

Chelidonium: Very irregular. Violent, with tightness of the chest.

Cicuta: Trembling palpitation.

Cinchona: With rush of blood to face, heat and redness of face, with cold hands; after loss of fluids.

Coca: Violent palpitation of the heart.

Cocculus: From quick motion and mental excitement, with dizziness and faintness.

Coffea: Violent, irregular, with trembling of limbs.

Colchicum: Violent, with anxiety.

Conium: Violent, after drinking.

Crocus: Palpitation, anxiety at the heart, with a sensation of weakness extending thence through the whole abdomen and continuing down to the soles of the feet (Allen). Anxious (Hering).

Croton tigl.: Palpitation of the heart in the afternoon. Palpitation after dinner, especially on lying down. Violent palpitation.

Cuprum ac.: Violent palpitation of the heart.

Curare: Heaviness of the heart, with severe palpitation.

Dulcamara: Palpitation, especially at night, violent and perceptible externally. Violent palpitation, as if he felt the heart beating outside the thorax (Allen). At night (Hering).

Euphrasia: Violent, long-continued pain in the heart, with audible palpitation, in the afternoon. Palpitation on walking rapidly.

Ferrum: Better walking slowly; also in onanists; after loss of fluids; with blood-spitting.

Graphites: With anxiety; with nosebleed.

Hepar: With fine stitches in the heart and left half of the chest.

Hydrastis: With faintings.

Hydrocyanic ac.: Palpitation, with soft, full pulse.

Iberis: Slight palpitation of the heart, with a sensation of weight and pressure in the region of the heart, with occasional sharp stinging pains in that region, passing from before backward and lasting but a short time. Each slight exertion caused slight palpitation, with dizziness. Palpitation seen plainly over the whole chest.

Ignatia: At night and in the morning, in bed.

Illicium: With aphthæ and weakness.

Iodum: Violent, worse from the least exertion.

Jatropha: Palpitation of the heart, after moving about. Uneasiness

in the night, from palpitation and rush of thoughts.

Kali bichr.: Dyspnœa, accelerated pulse, heat, awakens suddenly with a start, 2 A.M.

Kali carb.: In spells, taking his breath.

Kali cyan.: Palpitation of the heart.

Kali jod.: Worse while walking.

Kali nitr.: Violent palpitation at midnight when lying on the right side. Palpitation on motion and on standing up, with heat of the face and oppression of the chest. Momentary palpitation at times.

Kalmia: Dyspnœa, pain in limbs; stitch in lower part of chest; right-sided prosopalgia.

Lachesis: Can bear no pressure on throat or chest; must sit up or lie on the right side; numbness of the left arm; fainting; anxiety.

Ledum: Pushing or pressing inward at the left edge of the sternum.

Lilium: Worse lying on either side.

Lycopodium: Trembling, pulsating tearing in the region of the heart.

Lycopus virg.: The cardiac distress and palpitation were increased by ascending (hill or stairs), by excitement, by deep inspiration, and by thinking of them. On lying down palpitation with altered rhythm, the systole being shortened and the interval lengthened.

Magnesium mur.: While sitting, going off on motion.

Mancinella: And weakness.

Manganum ac.: Strong, irregular, trembling, without abnormal sounds.

Mercurius: With fear, worse at night.

Mercurius cor.: In sleep.

Mercurius cyan.: Strong palpitation of the heart, lifting up the hand applied to the chest.

Millefolium: With excessive and bloody sputum.

Muriatic ac.: Felt in the face.

Naja trip.: Slight palpitation of the heart, soon.

Natrum carb.: Violent, anxious palpitation when ascending, and at night when lying on left side.

Natrum mur.: With morning headache, anxious, when moving or exerting one's self; when lying on left side. When going to sleep and on awaking.

Nitric ac.: With anguish on going up-stairs.

Nitrum: On rising, on moving about quickly, with heat of the face and oppression of chest.

Nux mosch.: With fainting, followed by sleep; hysteria, with weak, strong pulse and changing irregularity in heart's beat.

Nux vom.: Heart feels tired; palpitation on lying down; frequent belching. With orgasm of blood; from mental emotions; from protracted study; after eating, especially after spices or coffee.

Oleander: With weakness and empty feeling of chest, and at the same time fulness in pit of stomach. Anxious; chest feels expanded.

Petroleum: Fainting, with ebullitions; heat; pressing on the heart and palpitation.

Phosphorus: From every emotion, with rush of blood to the chest, especially in the rapidly growing youth.

Phosphoric ac.: In children and young persons who grow too fast; after grief; after self-abuse.

Physostigma: Violent palpitation of the heart, with the nervous motions. Violent palpitation of the heart, with throbbing all over the body, at midnight.

Platina: With great anxiety.

Podophyllum: With a clucking sensation rising up to throat obstructing respiration. From mental emotion or exertion, with trembling in ascending colon, heavy sleep, fatigue on awaking in the morning; drowsy all forenoon.

Pulsatilla: In violent paroxysms, often with anguish and obscuration of sight; trembling of limbs; from chagrin, fright, or joy; with anæmia, chlorosis; strong, with suppressed pulse; after dinner.

Rhus tox.: Violent when sitting still.

Rhus ven.: Palpitation, with stitches in the heart.

Ruta: Anxious.

Sabina: At every motion, especially when ascending.

Sanguinaria: Before vomiting, with great weakness.

Sarsaparilla: Without fear, mostly during the day.

Secale: Oftener at night, with contracted and frequently intermitting pulse.

Sepia: After emotions of mind; wakes up with violent beating of the heart; with anxiety about things which happened years ago.

Silica: While sitting, so that he has to hold on to something. Violent hammering after every quick or violent motion.

Spigelia: Violent; worse bending forward; high fever; stitching pains; when he sits down; after rising in the morning; from deep inspiration or holding the breath; from worms; from the least motion.

Spongia: Violent, with pain, gasping respiration; suddenly awakened after midnight, with suffocation; great alarm; anxiety.

Staphisagria: From the least motion; from mental exertion; from music; after siesta.

Stramonium: Beating of the heart, so increased by motion he cannot speak for hours; twitching, as in chorea; murmurs instead of regular sounds; consequent on fright.

Strychninum: Palpitation of the heart.

Sulphur: When going up-stairs or when climbing a hill.

Sulphuric ac.: With or without fear or anxiety.

Sumbul: Palpitation of the heart, with transient flushes of heat. Sinking of the heart, which beats softly, as if in water; palpitation from the least exertion; palpitation at 9 P.M.; palpitation and jerking of the heart at intervals, worse during the flush of heat, and especially after drinking stout; palpitation of the heart, violent and visible, prolonged after running up-stairs; palpitation of the heart, after drinking beer, increased by paying attention to it; beating of the heart at intervals without any apparent exciting cause; heart still palpitated, violent and irregular at times, with a bellows' sound; flushes of heat in floods from the back.

Tabacum: At night, tight across the chest, with angina pectoris. (Hering.) Suffered chiefly at night, from paroxysms of præcordial oppression, with palpitation and pain between the shoulders. Palpitation and pain in the cardiac region. Palpitation while lying in bed, on the left side, which ceases on turning to the right side. For some time he suffered from palpitation, with pain and constriction of the chest, which came on in the form of an attack, either in the evening or night; afterwards a similar attack from

inhaling the fumes. Palpitation, with tightness of the throat. For about a month during the night he frequently had attacks of palpitation, with oppression and pain about the shoulders. Violent palpitation all night. (Allen.)

Tarantula: Palpitation, with sadness, inclined to tears, oppression, headache, with general perspiration and burning heat. Palpitation of the heart without any known cause. Palpitation of the heart, with great oppression, panting respiration headache and prostration. Palpitation of the heart, stitches interfering with breathing; pain in the back; painful feeling in the spinal column. Severe palpitation, with murmur in the heart.

Tellurium: With throbbing through body and full pulse, followed by sweat.

Thea: Heart sometimes palpitates, and at other times seemed motionless. Palpitation of the heart at night, with inability to lie on the left side. Violent palpitation and considerable pain.

Thuja: Periodical, in rest or motion; from ascending; anxious, when awaking in the morning; audible, with violent congestion to chest.

Valeriana: Palpitation.

Veratrum alb.: Strong, with chorea. Violent, visible, anxious palpitation. Palpitation in the anæmic; agony of death, legs cold; difficult breathing, better at rest or lying down.

Veratrum vir.: Faintness and blindness; when rising from lying; from sudden motions; better lying quietly.

General Symptoms.

With a feeling as if boiling water was being poured into the chest: Acon.

As if the heart was working in water: Bovista.

Darting in the region of the heart, with fulness: Æscul.

With pressure on the chest as if a lump lay there, or as if the chest was stuffed up: Ambra.

With contraction of the epigastrium and a weak feeling at the pit of the stomach: Amm. carb.

After suppressed herpes or suppressed foot sweat: Arsen.

From suppression of discharges in women: Asaf.

When riding or walking, palpitation compels him to stop: Aur.

Soreness in the region of the heart: Baryta.

A kind of palpitation, with gurgling at the heart on going up-stairs: Bellad.

With fine stitches in the heart and left half of the chest: Hepar.

Can bear no pressure on the throat or chest: Laches.

Pulsating tearing in the region of the heart: Lycop.

With hysteria, with weak, small pulse, and changing irregularity in the heart's beat: Nux mosch.

Heart feels tired: Nux vom.

With weakness and empty feeling of chest, and at the same time fulness at the pit of the stomach: Oleand.

Before vomiting, with great weakness: Sanguin.

With throbbing through whole body, and full pulse followed by sweat: Tellur.

Palpitation of the heart, sounding in the ears like drum-beats: Bufo.

Roused suddenly; palpitation; had to "lie on it," with hand supporting heart: Chin. sulph.

Violent palpitation as if he felt the heart beating outside the thorax: Dulcam.
Palpitation, seen plainly over the whole chest: Iber.
Uneasiness in the night, from palpitation and rush of thoughts: Jatropha.
Strong palpitation of the heart, lifting up the hand applied to the chest: Merc. cyan.
Sinking of the heart, which beats softly as if in water: Sumbul.
Beating of the heart at intervals without any apparent exciting cause: Sumbul.
Palpitation of the heart without any known cause: Tarant.
Heart sometimes palpitates and at other times seems motionless: Thea.

Mental Symptoms.

Agony: Aurum, Ver. alb.
Agony of death. Verat. alb. (in the anæmic).
Anguish: Arsen., Pulsat.
Chiefly at night: Arsen.
With obscuration of sight: Pulsat.
Alarm: Spongia.
Fear: Mercur., Sulph. ac.
Without fear: Sarsap.
At night: Mercur.
With or without fear: Sulph. ac.
Anxiety: Agar., Amm., carb., Bar. carb., Calcar., Calc. phosph., Camphora, Colchic., Crocus, Graphit., Laches., Natr. carb., Natr. mur., Oleand., Platina, Ruta, Sepia, Stannum, Spongia, Sulph. ac., Thuja, Ver. alb.
About things which happened years ago: Sepia.
Audible, as if dying: Amm. carb.
Followed by trembling weakness, particularly of the calves: Calc. phosph.
With sudden oppression of breathing: Camphora.
With nosebleed: Graphit.
When ascending: Natr. carb.
With morning headache: Natr. mur.
Chest feels expanded: Oleand.
From giving directions in her household affairs: Stannum.
On waking in the morning: Thuja.
With or without anxiety: Sulph.ac.
After emotions of mind: Sepia, Ananth.
From the least emotion: Ananth.
From mental emotion: Phosphor. (with rush of blood to chest).
From mental excitement: Coccul.
From excitement: Lyc. virg.
From mental exertion: Staphis.
From protracted study: Nux vom.
After grief: Phosph. ac., Pulsat.
From fright: Pulsat., Stramon.
From indignation: Chin. sulph.
From chagrin: Pulsat.
From joy: Pulsat.
From music: Staphis.
When singing in church: Carb. an.
Renewed by thinking about it: Arg. nitr., Bar. carb.
Worse thinking of the palpitation and cardiac distress: Lyc. virg.
Worse paying attention to it: Arg. nit., Sumbul.
After drinking beer: Sumbul.

Concomitants.

With headache: Æthusa, Natr. mur., Tarant.
In the morning: Natr. mur.
With right-sided prosopalgia: Kalmia.
With inability to speak: Amm. carb., Stramon.
Beating of heart, so increased by motion he cannot speak for hours: Stramon.
With involuntary flow of tears: Amm. carb.

With blindness: Ver. alb.
With obscuration of sight: Pulsat.
With vertigo: Æthusa, Cactus, Coccul.
And faintness: Coccul.
With faintness: Chamom., Coccul., Ver. alb.
And dizziness: Coccul.
And blindness: Ver. alb.
With faintings: Hydrast., Laches., Nux mosch, Ver. alb.
Followed by sleep; hysteria: Nux mosch.
Violent, visible: Ver. alb.
With unconsciousness: Actea, Cactus.
With weakness: Illic., Mancin., Oleand., Sanguin.
And aphthæ: Illic.
Before vomiting: Sanguin.
With fever: Spigel.
With redness of the face: Agar., Cinchon.
And heat with cold hands: Cinchon.
With chorea: Stramon., Ver. alb.
With heavy sleep: Podoph.
With fatigue on waking: Podoph.
With frequent belching: Nux vom.
With nausea: Arg. nitr.
With excessive and bloody sputum: Millef.
With blood-spitting: Ferrum.
With nosebleed: Graphit.
With angina pectoris: Tabac.
With the approach of the menses: Cactus.
With amenia, chlorosis: Pulsat.
With hysteria: Nux mosch.
With a kind of gurgling about the heart: Bellad.
With murmurs instead of the regular sounds: Stramon.
With suffocative attacks: Ananth.
With a painful sensation as if the heart was constricted: Angust.
With anxious restlessness: Aspar.
With oppression of the chest: Aspar.
With a sensation of weakness extending from the heart through the whole abdomen and continuing down to the soles of the feet: Crocus.
With heaviness of the heart: Curare.
With long-continued pain in the heart: Euphras.
With soft, full pulse: Hydr. ac.
With a sensation of weight and pressure in the region of the heart: Iber.
With occasional sharp, stinging pains in the region of the heart, passing from before backward and lasting but a short time: Iber.
With dizziness: Iber.
With cardiac distress: Lyc. virg.
With altered rhythm: Lyc. virg.
With throbbing all over the body: Physos.
With stitches in the heart: Rhus ven.
With jerking of the heart: Sumbul.
With a bellows' sound: Sumbul.
With paroxysms of præcordial oppression: Tabac.
With pain between the shoulders: Tabac.
With pain in the cardiac region: Tabac.
With tightness of the throat: Tabac.
With oppression and pain about the shoulders: Tabac.
With sadness, inclined to tears: Tarant.
With oppression: Tarant.
With general perspiration and burning heat: Tarant.
With panting respiration: Tarant.
With prostration: Tarant.
With murmur in the heart: Tarant.
With painful feeling in the spinal column: Tarant.
With stitches interfering with breathing: Tarant.
With inability to lie on the left side: Thea.
With considerable pain: Thea.
With ebullitions: Æscul., Cinchon.,

Kali bichr., Kali nitr., Nux vom., Petrol., Phosphor., Physos., Tellur., Sumbul, Tarant.
Heart's action full, heavy, can feel the pulsation all over the body: Æscul.
With throbbing through whole body, and full pulse, followed by sweat: Tellur.
With rush of blood to the face: Cinchon.
With rush of blood to the chest: Phosphor.
With heat of the face and oppression of the chest: Physos.
With throbbing all over the body, at midnight: Sumbul.
With transient flushes of heat: Sumbul.
With flushes of heat in floods from the back: Sumbul.
With general perspiration and burning heat: Tarant.
With paleness of the face: Ambra, Camphora.
And cold body: Camphora.
(Felt in the face): Mur. ac.
With stitches: Hepar, Kalmia, Spigel.
With fine stitches in heart and left half of chest: Kalmia.
In the lower part of the chest: Kalmia.
With pressure on chest in region of heart: Ambra, Ledum, Petrol.
As if a lump lay there; or as if the chest was stuffed up: Ambra.
Pushing or pressing inward at the left edge of the sternum: Ledum.
With soreness in the region of the heart: Bar. carb.
With numbness of the left arm: Actea, Laches.
With tightness across the chest: Chelid., Tabac.
With congestion of the chest: Thuja.
With empty feeling in the chest: Oleand.
From deep inspiration or holding the breath: Spigel.
With difficult breathing: Amm. carb., Aurum, Cactus, Camphora, Kali bichr., Kalmia, Spongia, Ver. alb.
And loud: Amm. carb.
In spells: Kali carb.
With pain in the limb: Kalmia.
With a clucking sensation rushing up to the throat, obstructing respiration: Podoph.
With gasping respiration: Spongia.
With agony of death (in the anæmic); better at rest or lying down: Ver. alb.
With asthma: Arg. nitr.
With suffocation: Spongia, (after midnight).
With cold sweat: Amm. carb. (followed by sweat: Tellur.).
With cold face, hands and body: Camphora.
With cold hands: Cinchon.
With cold legs: Ver. alb.
With trembling: Cicuta, Lycop.
Trembling of limbs: Coffea.
Trembling of hands: Amm. carb., Bovista.
Trembling of calves: Calc. phos.
With twitches: Camphora, Stramon.
As in chorea: Stramon.

General Character of Palpitation.

Periodical: Thuja.
Paroxysmal: Pulsat.
In spells: Kali carb.
Audible: Amm. carb., Arsen., Thuja.
Chiefly at night, with anguish: Arsen.
With violent congestion to chest: Thuja.
Visible: Arsen., Bovista, Sumbul, Ver. alb.
After going up-stairs, as if the heart was working in water: Bovista.

Anxious: with fainting: Ver. alb.
Violent: Agar., Ambra, Ananth., Angust., Ant. tart., Arg. nitr., Bromin., Canthar., Coffea, Colchic., Conval., Crot. tigl., Cupr. ac., Dulcam., Euphras., Iodum, Kali nitr., Natr. carb., Physos., Rhus, Sepia, Silica, Spigel., Spongia, Sumbul, Thea, Ver. alb.
In the evening, so that she cannot lie on left side: Brom.
With anxiety: Colchic.
After drinking: Conval.
From least exertion: Iodum.
When sitting still: Rhus.
Wakes from sleep: Sepia.
So that he has to hold on to something: Silica.
Worse on bending forward: Spigel.
With pain, gasping respiration: Spongia.
Visible, anxious: Ver. alb.
And perceptible externally: Dulcam.
With the nervous motions: Physos.
Severe: Curare, Tarant.
Slight: Iber.
Momentary: Kali nitr. (at times).
Strong: Agar., Arsen., Merc. cyan., Pulsat., Ver. alb.
With suppressed pulse: Pulsat.
With chorea: Ver. alb.
Intermittent: Aurum, Secale.
Irregular: Agar., Alum, Arsen., Aurum, Coffea.
With a bellows' sound: Sumbul.
Large and small beats intermixed: Alum.
With contracted pulse: Secale.
With suppressed pulse: Pulsat.
With small pulse: Arsen., Asaf.
With full pulse: Tellur.

Clinical Indications.

(See also Mental Symptoms.)

After loss of fluids: Cinchon., Ferrum.
From indigestion: Chin. sulph.
After self-abuse: Phosph. ac.
In onanists: Ferrum.
In the anæmic: Ver. alb.
In rapidly-growing youth: Phosphor.
In children and young persons who grow too fast: Phosph. ac.
From worms: Spigel.
From suppressed herpes and foot-sweat: Arsen.
From suppressed discharges (in women): Asaf.

Aggravations and Determining Causes.

(See also Mental Symptoms.)

Time.

Morning: Ignat., Carb. an., Chin. sulph., Natr. mur., Spigel., Thuja.
In bed: Ignat.
With headache: Natr. mur.
Day (during): Sarsap.
Afternoon: Crot. tigl., Euphras.
Evening: Angust., Bromin., Sumbul, Tereb. (so that she cannot lie on left side).
At 9 P. M.: Sumbul.
When lying: Angust.
Night: Arsen., Natr. carb., Natr. mur., Secale, Spongia, Tabac., Thereb.
While lying: Benz. ac.
Or in the morning in bed: Ignat.
In sleep: Mercur.
With contracted pulse, intermitting: Secale.
With tightness across the chest: Tabac.
Worse all night: Tabac.
At midnight: Kali nitr., Physos.
After midnight: Kali bichr., Spongia.
Awakens suddenly with a start at 2 P.M.: Kali bichr.

Motion and Rest.

From motion: Aspar., Coccul.,

Kali nitr., Natr. mur., Stramon., Thuja, Ver. vir.
Quick: Coccul.
Sudden: Ver. vir.
So increased by motion he cannot speak for hours: Stramon.
From every motion: Sabina, Silica.
Especially when ascending: Sabina.
Quick or violent: Silica.
From least motion: Spigel., Staphis.
(Compels him to stop: Aurum).
After motion: Aspar., Iber.
From rest: Thuja (or motion).
When ascending: Arsen., Bellad., Bovista, Lyc. virg., Natr. carb., Sabina, Sulphur, Thuja.
Rapidly: Euphras.
When going up-stairs: Arsen., Aspar., Bellad., Bovista, Lyc. virg., Sulphur, Sumbul.
Prolonged after running up-stairs: Sumbul.
When climbing a hill: Sulphur.
When walking: Ambra, Aurum, Cactus, Euphras., Kali jod.
In the open air, with paleness of the face: Ambra.
Or riding; compels him to stop: Aurum.
At night: Cactus.
When riding: Aurum.
From rest (on motion): Thuja.
Worse in bed: Angust., Tabac.

Position.

From standing up: Kali nitr.
When bending forward: Spigel.
When he sits down: Spigel. (after rising in the morning).
On sitting down: Agar. (some irregular strong beats; anxious oppression).
While sitting: Angust, Aspar., Benz. ac., Magn. mur., Rhus, Silica.
So that he has to hold on to something: Silica.
Or stooping: Angust.
So that the leaves of the book he held in his hand trembled: Aspar.
While lying: Angust., Benz. ac., Crot. tigl., Laches., Lilium, Lyc. virg., Nux vom.
While lying on the back: Arg. (cannot lie on the back).
On the left side in bed: Angust.
When lying: Angust., Crot. tigl., Lyc. virg.
When lying on the left side: Angust., Bromin., Bar. carb., Cactus, Lilium, Natr. mur., Tabac., Thea.
With soreness in the region of the heart: Bar. carb.
At night: Natr. carb.
Cannot lie on the left side: Bromium.
While lying on the right side: Chin. sulph., Laches., Lilium, Kali nitr.
When lying on either side: Lilium, (cannot lie on either side).
When rising from lying: Ver. vir.
When stooping: Angust. (or sitting).
Leaning against the back: Chin. ars.

Exertion.

From exertion: Natr. mur., Podoph.
With a rumbling sensation in ascending colon, heavy sleep, fatigue on awaking; drowsy all forenoon: Podoph.
From any exertion: Arnica, Cactus, Iodum.
Violent: Iodum.
From sudden muscular exertion: Arg., Arg. nitr.
From overexertion: Asaf., Bovista.
From slight exertion: Iber.

From the least exertion: Sumbul.
From rest: Thuja (or motion).

Sleep.

When going to sleep: Natr. mur.
Awakened by the palpitation: Alum., Cann. ind., Carb. an., Chin. sulph., Kali bichr., Natr. mur., Sepia, Spongia.
Morning: Carb. an.
With the violent beating: Sepia.
With suffocation Spongia.
On walking: Natr. mur., Thuja.
In sleep: Mercur.
In the morning: Thuja.
After waking: Camphora, Spongia.
With twitches: Camphora.
After siesta: Staphis.

Eating and Drinking.

After drinking: Benz. ac., Conium.
After breakfast: Chin. sulph.
After dinner: Pulsat., Crot. tigl.
After meals: Calcar.
After eating: Camphora, Carb. an., Nux vom.
Especially after spices or coffee: Nux vom.
After drinking stout: Sumbul.
After drinking beer: Sumbul.

Miscellaneous.

From deep inspiration: Lyc. virg.
While at stool: Chin. sulph.
During the flush of heat: Sumbul.
From the least emotion: Ananth.
From indignation: Chin. sulph.
From excitement: Lyc. virg.
Thinking of the palpitation and cardiac distress: Lyc. virg.
Paying attention to it: Sumbul, (after drinking beer).

Ameliorations.

REST: Arnica, Carb. an., Ver. alb., Ver. vir.
Goes off by rest: Arnica.
Must lie still with the eyes closed: Carb. an.
Goes off lying on right side: Tabac.
Must sit up or lie on the right side: Laches.
Better lying down: Ver. alb., Ver. vir., Tabac.
MOTION: Magn. mur., Ferrum.
Goes off on motion: Magn. mur.
Better walking slowly: Ferrum.
When sitting up: Angust.
By lying in the abdominal position: Chin. sulph.
Lying on the heart: Chin. sulph. (alternating with change of position).
Lying on the right side: Tabac.
From stretching: Chin. sulph.

Summary and General Ameliorations.

Rest: Arnica, Carb. an., Ver. alb, Ver. vir.
Motion: Magn. mur., Ferrum.
Sitting up: Laches.
Lying down: Carb. an., Ver. vir.
Lying on right side: Laches., Tabac.
Closing the eyes: Carb. an.
Pains: At times tearing rheumatic pains in the extremities, relieving the heart: Benz. ac.

SENSATIONS.

Absinthium: Tremor of the heart felt towards the back.

Aconite: Oppression about the præcordia, burning flushes along the back. Palpitation, with a feeling as if boiling water was poured into the chest. Feeling of fulness; pulse hard, strong, contracted. Fainting, with tingling.

Actea: Left arm numb and as if bound to the side; numbness of the body.

Æsculus: Burning in the region of the heart.

Agaricus: Anxious sensation of pressure. Constricted feeling of a lump in the epigastrium, with pain under the sternum; drawing in region of diaphragm, sharp pains in left side.

Ailanthus: Dull pain and contracted feeling in the region of the base of the heart and centre of left lung.

Ambra: Palpitation, with pressure in the chest as if a lump lay there or as if the chest was stuffed up.

Amyl nitr.: Cardiac oppression and tumultuous heart action.

Anantherum: Burning and sensation of weight in the heart, with sadness, anguish and fear of death. Stitches and formication in the heart, with great anxiety. Lancinations, cramps and weakness of the heart, which seems too full of blood and unable to beat, with oppression; pulse slow and full, then accelerated, hard and dicrotic. Sensation as if the bloodvessels of the heart and larynx were contracted. Stitches and cramps in the heart, with sensation as if its apex were pinched very hard. Trembling of the heart, with sensation as if it shook. Sensation as if the great vessels of the heart were distended in various parts. Heavy and painful heart. Heart seems paralyzed, as if it could not beat any more, with death-like weakness.

Angustura: Violent palpitation of the heart when sitting or stooping, with a painful sensation as if the heart was constricted.

Argentum: Full feeling in the region of the heart; frequent spasmodic though painless twitchings of whole cardiac muscle, especially on lying on back; fears apoplexy.

Argentum nitr.: Heart's action irregular, intermittent, with an unpleasant sensation of fulness; exertion causes strong beating, worse when noticing it.

Arnica: Region of the heart feels as if bruised.

Asafœtida: Pressure in the region of the heart as if the heart was too full and expanded, pulse small.

Asparagus: Palpitation of the heart occurred, with oppression of the chest. Slight sensation of stitches in the region of the heart, after eating.

Aurum: Feels as though the heart ceased and then suddenly gave one hard thump.

Baptisia: Heart's pulsations seem to fill the chest.

Baryta carb.: Feels the heart beat.

Belladonna: Pressure in the cardiac region which arrests the breathing and causes anxiety. Gurgling at the heart, kind of palpitation, when going up-stairs.

Benzoic ac.: Sense of weakness in the præcordia.

Borax: Sensation as if the heart were on the right side and were being squeezed.

Bovista: Visible palpitation after going up-stairs, as if the heart was working in water; after overexertion.

Bryonia: Oppression in the region of the heart.

Bufo: Feeling as if the heart was very large, and plunged in a vessel of water. Lancinating and pulling in the region of the heart, as if it were being distended. Sensation of scraping and weight in the heart. Trembling feeling at the heart.

Cactus: Sensation of constriction in heart, as if an iron hand prevented its normal movements.

Calcarea: Tremulous pulsation of heart, worse after eating, at night, with anguish.

Calcarea phosph: Feels the beating of the pulse, not frequent but quick; while sitting feels it in the nape of the neck and left chest.

Camphora: Præcordial distress when loudly spoken to; sensation of severe coldness and irresistible sleepiness.

Cannabis ind.: Sensation as if drops of water were falling from the heart.

Cannabis sat.: Violent beating of the heart on moving the body and on stooping, with a warm sensation about the heart.

Cantharis: Stitch, followed by a crawling sensation.

Causticum: Oppression of the heart, with lowness of spirits.

Cereus bon.: Sensation of a great stone laid upon the heart; soon after, sensation as if the chest was broken out just in front of the heart. Feeling as if the heart was transfixed by a blunt instrument, as on a bolt.

Cereus serp.: Paralyzed feeling at heart (9.50 P.M.)

Centaurea tag.: Sensation of dilatation of the heart, with anxiety.

Chininum ars.: Sensation as if the heart had stopped still; no perception of the beating of the heart; after 1 P.M.

Chininum sulph.: Slight uneasiness in the præcordia. Sitting, heart's action subjectively felt, extending to head; having just had an incomplete stool, with protrusion of mucous membrane especially right side, after postponement in the forenoon. Pulsations of the heart, conscious, slightly accelerated in the forenoon. Pulsation of the heart felt in the left chest after going upstairs, in the afternoon. Conscious pulsation from heart to left chest, arm and abdomen, in the forenoon.

Cicuta: Feels as if the heart stopped beating; and sometimes faint feeling therewith. (Hering.) Sudden sensation as if the heart stopped when walking. (Allen.)

Crocus: Warmth about the heart, with anxiety, and some oppression of breath, so that she cannot breathe deeply, with inclination to take a deep breath; she feels relieved every time after frequent yawning. Sensation of great emptiness in the præcordial region. Drawing in the præcordial region, extending to the stomach like colic. Palpitation, anxiety at the heart, with a sensation of weakness extending thence through the whole abdomen and continuing down to the soles of the feet.

Croton tigl.: Some jerkings in the left side of the heart.

Curare: Heaviness of the heart, with severe palpitation.

Cyclamen: Buzzing in the region of the heart; sensation of something alive running in the heart.

Digitalis: Dull uneasiness in various parts of the region of the heart, with a sensation of weakness in the forearm, all the evening. A sudden sensation as though the heart stood still, with great anxiety.

Glonoinum: Pressure in heart as if it was being contracted. Fulness in the heart. Purring noise in the region of the heart when lying; pulse intermits; must have head high; worse when lying on left side, better on the right.

Graphites: Constriction; pressure; sensation like an electric shock from heart towards the front of neck.

Iberis: On turning on the left side, a sharp, sticking pain is felt as if a needle were crosswise in the ventricles and pricked at each contraction. Slight palpitation of the heart, with a sensation of weight and pressure in the region of the heart, with occasional sharp stinging pains in that region, passing from before backward and lasting but a short time.

Iodium: Sensation as if the heart was being squeezed together.

Jacea (Viola tricolor): Oppression and stitches in the heart on bending forward while sitting. Anxiety about the heart while lying, with beating like waves.

Jatropha: The beating of the heart suddenly became distinct to the hand and was even felt in the chest. Violent beating of the heart, shaking the chest, when walking slowly about the room. Uneasiness at night, from palpitation and rush of thoughts.

Kali bichr.: Cold sensation about the heart; tightness of the chest; dyspnœa.

Kali carb.: Cramping pains, as if the heart was hanging by bands; burning.

Kalmia: Pressure like a marble from epigastrium towards the heart, with a strong, quick, heart-beat. Every beat has a strumming, as if it would burst, along the sternum to throat. The third or fourth beat is harder, and is followed by an intermission.

Lachesis: Numbness of the left arm.

Lachnanthes: Feels hot in the chest and around the heart. Boiling and bubbling in the chest and cardiac region. While lying feels the beating of his heart in his head.

Laurocerasus: Beating, fluttering sensation in the region of the heart; gasps for breath; sometimes has slight, dry cough. Sensation as if the heart would turn over, causing him to gasp for breath; better lying down.

Ledum: Pushing or pressure inward at left edge of sternum; palpitation.

Lilium: Feels as if squeezed in a vise. Heart feels as if grasped, with pain and heaviness of left mamma to scapula. Heart as if violently grasped, then suddenly released; and so on alternately. Constrictive pain about heart extending through to scapula. Heaviness in region of the heart. Fluttering, general pain and feeling; hurried and forced feeling about the apex; better sitting still. Fluttering awakens her at night, with cold hands and feet covered with cold sweat. Conscious pulsations over whole body, and out-pressing in the hands and arms, as if blood would burst through the vessels.

Lithium carb.: Fluttering and

trembling, sudden shocks in the cardiac region.

Lobelia: Sensation of weakness and pressure in epigastrium, rising to heart. Short sensation as if the heart would stand still; deep in above the heart, a pain. Sawing sound about the heart, with violent pains, diarrhœa and vomiting.

Lycopodium: Sensation as if the circulation stood still, or ebullitions.

Lycopus virg.: A very marked sensation in the cardiac region of a constrictive character, lasting three hours, in the early part of the day. Cardiac distress, scarcely amounting to pain, most marked at the apex, after rising.

Manganum ac.: Sudden shocks at the heart and in the left side of the chest from above downward.

Mercurius: Weakness at the heart, as if life was ebbing away; awakens with trembling at the heart, and agitation as if frightened.

Naja trip.: Nervous sensation about the heart. Feeling of depression and lowness about the heart. For three days past has felt the want of something about the præcordia; several days ago tried to sing, but had no power to throw out the voice. Uneasiness about the heart while walking. Heat and uneasy about the heart toward evening. Fluttering of the heart attended with headache. Whilst writing a sudden attack of fluttering at the heart, with rising in the throat.

Natrum mur.: Fluttering of the heart, with weak, faint feeling, worse lying down.

Nux mosch.: Feels as if her head would burst and her heart be squeezed off. Trembling, fluttering of heart, as if from fright.

Nux vom.: Heart feels tired.

Oleander: Distress at the heart and anxiety.

Opium: Burning about the heart.

Petroleum: Cold feeling about the heart. (Arnica, Camphor, Kali carb., Natr. mur. Oleand.)

Phosphorus: Great pressure on the middle of the sternum, orthopnœa, dyspnœa, with inability to exert himself; palpitation.

Phytolacca: Awakens with lameness near the heart, worse during expiration, cannot get to sleep again.

Physostigma: Uneasiness and distress about the heart, mostly without violent palpitation, but with a fulness and pulsation over the body, so that I counted the pulse, 72, by the ear; this uneasiness is principally at night, causing restlessness, tossing from one side to the other, with dry heat all over. Happening to get on the left side, my attention was, for the first time, directed to the tumultuous action of the heart, which compelled me to turn again on the back to escape the strange sensation. As the fresh air struck me, a choking sensation, with fluttering of the heart, overcame me and oppressed me during the whole forenoon; I heard and felt the fluttering of my heart in my throat, with a sensation of faintness by motion and some relief in a recumbent sitting position, not by lying down; fluttering keeps steadily on, with attacks of vertigo, towards evening, especially when changing positions; heart's action irregular; intermission every third, fourth or fifth

beat; sometimes it seems to me as if I could hear every artery in my body beat. While sitting still he felt a pulsation through the whole body, particularly in the chest; each beat of the heart was distinctly perceptible in the chest and temples. Could readily count my pulse in the carotids, and hear the two sounds of the heart as my head lay upon the pillow.

Pilocarpinum: Weakness of the heart.

Podophyllum: Clucking sensation rising to throat, preventing respiration; palpitation.

Pulsatilla: Beating in the chest interrupts sleep; old maids. Burning in the region of the heart. Heaviness, pressure or sensation of fulness every evening.

Rhus: Chest and heart feel weak after a walk; trembling sensation in the heart; numbness and lameness of left arm.

Rumex: Heart feels as if it suddenly stopped beating, followed by a heavy throbbing through the chest. Burning in the region of the heart.

Sanguinaria: Weak feeling at the heart.

Scutellaria: Towards evening a sensation of throbbing about the heart.

Sepia: Interruption of the beating of the heart, most after dinner; alarmed, quivering motion. An occasional hard "thump" of the heart. (See Aurum, Zincum.)

Spigelia: Purring feeling over the heart, not synchronous with the pulse.

Spongia: Attacks of oppression and cardiac pain, worse lying with the head low.

Staphisagria: Trembling beating of the heart.

Strychninum: Tightness about the præcordia. Fluttering sensation about the heart with faintness, in the morning. The heart's action was distinctly felt by the hand applied to the præcordia.

Sulphur: Sensation as if the heart was enlarged.

Sumbul: Palpitation and jerking of the heart at intervals, worse during the flush of heat, and especially after drinking stout; jerkings of the heart in the evening.

Tabacum: Suffered, chiefly at night, from paroxysms of præcordial oppression, with palpitation and pain between the shoulders. Darting pain, extending from the heart up to the vertex and sensation of constriction across the front of upper chest, with dyspnœa and disposition to take a full inspiration. Palpitation, with tightness of the throat. For some time he suffered from palpitation, with pain and constriction of the chest, which came on in the form of an attack either in the evening or night; afterwards a similar attack from inhaling the fumes. For about a month during the night he frequently had attacks of palpitation, with oppression and pain about the shoulders. (Allen.) Oppression at heart, pulse feeble, irregular. (Hering.)

Tarantula: Oppression and pain in the heart, as if a misfortune had happened, with weeping and moaning, followed by cramps and coldness in the extremities. Pain as if the heart and aorta were torn, with a tingling sensation. Sensation as if the heart turned and twisted around, with pain in the chest and general perspiration. Se-

vere pain in the aorta, extending to the subclavian, as if it was going to burst, with slight beating of the heart.

Terebinthina: Frightful oppression in the præcordial region. A feeling of warmth at the heart while sitting in the evening (of which she had noticed nothing during the whole day, though she had been in constant motion), so that she was obliged to yawn a great deal, with collection of water in the mouth.

Thea: Oppression of the heart and chest. Feeling of anxious oppression about the heart. A certain uneasiness of the heart, generally trembling and debility, making him feel somewhat sick the next day. Unusual and distressing sensation about the præcordia, as if he were continually on the verge of fainting. The heart sometimes palpitates, and at other times seemed motionless.

Valeriana: In the first quarter of an hour the beats are full and vigorous, in the second the diastole is shorter, the whole body being agreeably warm, and a tremulous, anxious sensation being experienced, which seems to come out of the abdomen.

Veratrum vir.: Burning, prickling.

Zincum: Feels as if a cap were over the heart; spine affected.

Peculiar Symptoms.

A feeling as if boiling water was being poured into the chest: Acon.

As if the heart was working in water: Bovista.

Beating like waves: Jacea (Viola tricolor).

Boiling and bubbling in the chest and cardiac region: Lachnanth. (gurgling, Bellad.).

Feels hot in the chest and around the heart: Lachnanth.

Heart's pulsations seem to fill the chest: Baptis.

As if the heart was too full and expanded: Asaf.

As if the heart was enlarged: Sulphur.

Constant feeling as of a lump in the epigastrium, with pain under the sternum: Agar.

Sensation as if the circulation stood still: Lycop.

Feels as though the heart ceased, and then suddenly gave one hard thump: Aurum (Sepia, Zincum).

As if an iron band prevented its normal movement: Cactus.

Feels as if squeezed in a vise: Lilium.

Sensation as if the heart was on the right side and was being squeezed: Borax.

Heart feels if violently grasped, then suddenly released, and so on alternately: Lilium.

Sensation as of something alive running in the heart: Cyclam.

As if the heart was hanging by bands: Kali carb.

As if the heart would turn over: Lauroc.

Every beat has a strumming, as though it would burst, along the sternum: Kalmia.

Conscious pulsation over the whole body, and out-pressing in the hands and arms, as if the blood would burst through the vessels: Lilium.

Weakness at the heart as if life was ebbing away: Mercur.

Sudden shocks in the cardiac region: Lithium.

Sudden shocks at the heart and in the left side of the chest from above downward: Mang. acet.

Sensation like an electric shock

from heart towards the front of the neck: Graphit.

Feels as if her head would burst and her heart be squeezed off: Nux mosch.

Sensation as if drops of water were falling from the heart: Can. ind.

Sensation as if the heart was ascending to the throat: Phytol.

The heart feels tired: Nux vom.

Feels as if a cap were over the heart; spine affected: Zincum.

Sensation of a great stone lay upon the heart; soon after, sensation as if the chest was broken out just in front of the heart: Cereus bon.

Feeling as if the heart was transfixed by a blunt instrument, as on a bolt: Cereus bon.

Sensation of dilatation of the heart, with anxiety: Cent. tag.

Sensation as if the heart had stopped still: Chin. ars.

No perception of the beating of the heart: Chin. ars.

Sitting, heart's action subjectively felt, extending to head: Chin. sulph.

Pulsation of the heart, felt in the left chest, after going up-stairs, in the afternoon: Chin. sulph.

Conscious pulsation from heart to left chest, arm and abdomen, in the forenoon: Chin. sulph.

Warmth about the heart, with anxiety, and some oppression of breath, so that she cannot breathe deeply, with inclination to take a deep breath; she feels relieved every time after frequent yawning: Crocus.

Palpitation, anxiety at the heart, with a sensation of weakness extending thence through the whole abdomen and continuing down to the soles of the feet: Crocus.

Some jerkings in the left side of the heart: Crot. tigl.

Sudden sensation as if the heart stopped, when walking: Cicuta vir.

Feels that he must move or his heart will stop beating: Gelsem.

A sudden sensation as though the heart stood still, with great anxiety: Digit.

On turning on the left side, a sharp sticking pain is felt as if a needle were crosswise in the ventricles and pricked at each contraction: Iber.

The beating of the heart suddenly became distinct to the hand and was even felt in the chest: Jatropha.

Violent beating of the heart, shaking the chest, when walking slowly about the room: Jatropha.

A very marked sensation in the cardiac region of a constrictive character: Lyc. virg.

Cardiac distress, scarcely amounting to pain, most marked at the apex, after rising: Lyc. virg.

For three days past has felt the want of something about the præcordia; several days ago tried to sing, but had no power to throw out the voice: Naja trip.

Fluttering of the heart attended with headache: Naja trip.

Whilst writing a sudden attack of fluttering at the heart, with rising in the throat: Naja trip.

Fulness and pulsation over the body, so that I counted the pulse, 72, by the ear: Physos.

As the fresh air struck me, a choking sensation, with fluttering of the heart, overcame me and oppressed me during the whole forenoon: Physos.

I heard and felt the fluttering of my heart in my throat, with a sensation of faintness by motion and some relief in a re-

cumbent sitting position, not by lying down: Physos.

Burning and sensation of weight in heart, with sadness, anguish and fear of death: Ananth.

Lancinations, cramps and weakness of the heart, which seems too full of blood and unable to beat, with oppression: Ananth.

Sensation as if the bloodvessels of the heart and larnyx were contracted: Ananth.

Stitches and cramps in the heart, with sensation as if its apex were pinched very hard: Ananth.

Trembling of the heart, with sensation as if it shook: Ananth.

Sensation as if the great vessels of the heart were distended in various parts: Ananth.

Heavy and painful heart: Ananth.

Heart seems paralyzed, as if it could not beat any more, with death-like weakness: Ananth.

Feeling as if the heart was very large and plunged in a vessel of water: Bufo.

Lancinating and pulling in the region of the heart, as if it were being distended: Bufo.

Sensation of scraping and weight in the heart: Bufo.

Trembling feeling at the heart: Bufo.

Sometimes it seems to me as if I could hear every artery in my body beat: Physos.

Each beat of the heart was distinctly perceptible in the chest and temples: Physos.

Could readily count my pulse in the carotids and hear the two sounds of the heart as my head lay upon the pillow: Physos.

The heart's action was distinctly felt by the hand applied to the præcordia: Strychnin.

Fluttering sensation about the heart, with faintness, in the morning: Strychnin.

Darting pain extending from the heart up to the vertex and sensation of constriction across the front of upper chest, with dyspnœa and disposition to take a full inspiration: Tabac.

Pain as if the heart and aorta were torn, with a tingling sensation: Tarant.

Sensation as if the heart turned and twisted around, with pain in the chest and general perspiration: Tarant.

Severe pain in the aorta, extending to the subclavian, as if it was going to burst, with slight beating of the heart: Tarant.

Palpitation, which came on in the form of an attack either in the evening or night (with oppression and pain about the shoulders): Thea.

A feeling of warmth about the heart, while sitting, in the evening, so that she was obliged to yawn a great deal, with collection of water in the mouth: Tereb.

Unusual and distressing sensation about the præcordia, as if he was continually on the verge of fainting: Thea.

Heart sometimes palpitates and at other times seems motionless: Thea.

Tremulous, anxious sensation, which seems to come out of the abdomen: Valer.

Mental Symptoms.

Anguish: Ananth., Calcar. (at night).

Alarm: Sepia (interruption of the beating of the heart most after dinner; alarmed, quivering motion).

Anxiety: Ananth., Agar., Bellad., Cent. tag., Crocus, Digit., Jacea, Thea, Valer., Oleand.

With pressure: Agar.

And arrest of breathing: Bellad.

While lying, with beating like waves: Jacea.
With fine stitches and formication in the heart: Ananth.
With sensation of dilatation of the heart: Cent. tag.
Fear of death: Ananth.
Sadness: Ananth.
Weeping: Tarant. (oppression and pain in the heart as if a misfortune had happened, with weeping and moaning, followed by cramps and coldness in the extremities).
Moaning: Tarant.
Uneasiness: Jatropha, Physos., Thea.
From palpitation and rush of thoughts: Jatropha.
Depression: Naja trip. (and lowness about the heart).
Distress: Camphora, Oleand., Physos.
About the heart when loudly spoken to: Camphora.
Lowness of spirits: Caustic., Naja trip.
With oppression about the heart: Caustic.
Fears apoplexy: Argent.
Worse when noticing the beating of the heart: Arg. nitr.

SUMMARIZED SENSATIONS.

Dull: Ailanth., Digit.
Pushing: Ledum.
Pulling: Bufo.
Pressure: Agar., Ambra, Asaf., Bellad., Glonoin., Graphit., Iber., Kalmia, Ledum, Lobel., Phosphor., Pulsat.
With anxiety: Agar.
In the region of the heart, as if it was too full and expanded: Asaf.
Arrests the breathing and causes anxiety: Bellad.
In the chest, as if a lump lay there, or the chest was stuffed up: Ambra.
Like a marble from epigastrium towards the heart, with a strong, quick heart-beat: Kalmia.
Or pushing inward at the left edge of the sternum: Ledum.
And weakness in the epigastrium, rising to the heart: Lobel.
On the middle of the sternum; orthopnœa; dyspnœa; with inability to exert himself: Phosphor.
Or heaviness or fulness, worse in the evening: Pulsat.
Heavy: Ananth., Curare.
Heaviness: Lilium, Pulsat.
And pain in left mamma to left scapula: Lilium.
Or pressure, or fulness, worse evenings: Pulsat.
Weight: Ananth., Bufo, Cereus bon., Iber.
Sensation of a great stone laid upon the heart: Iber.
Oppression: Acon., Agar., Amyl nitr., Aspar., Bryon., Caustic., Jacea, Physos., Spongia, Tabac., Tarant., Tereb., Thea.
With burning flushes along the back: Acon.
On bending forward: Agar.
And stitches on bending forward when sitting: Jacea.
About the chest: Thea.
And cardiac pain, worse lying with head low: Spongia.
With lowness of spirits: Caustic.
With weak, irregular pulse: Tabac.
Fulness: Acon., Argent., Arg. nitr., Glonoin., Pulsat.
With hard, strong, contracted pulse: Acon.
Heart's action irregular, intermittent: Arg. nitr.
Worse evenings: Pulsat.
Large: Bufo.
Dilatation: Cent. tag.
Distended: Bufo.
Emptiness: Crocus.
Enlarged (as if): Sulphur.

Tightness: Arsen., Strychnin.
Contracted: Ailanth., Glonoin.
And dull pain in the region of base of heart and the centre of the left lung: Ailanth.
Constrictive: Lycop. virg.
Constriction: Angust., Cactus, Graphit., Tabac.
In heart, as if an iron band prevented its normal movements: Cactus.
Squeezed: Borax, Lilium, Iodum, Nux mosch.
And as if the heart were on the right side: Borax.
As if in a vise, with pain in left mamma to scapula: Lilium.
Feels as if her head would burst and her heart be squeezed off: Nux mosch.
Grasped: Lilium. (Heart feels as if violently grasped, then released, and so on alternately).
Stuffed up: Ambra.
Weakness: Ananth., Benz. ac., Crocus, Lobel., Mercur., Natr. mur., Pilocarp., Rhus tox., Sanguin.
And pressure in epigastrium, rising to the heart: Lobel.
As though life was ebbing away: Mercur.
Tired: Nux vom., Rhus tox.
After a walk: Rhus tox.
Pulsations: Baptis., Calcar., Chin. sulph., Lilium, Lycop., Physos.
Seem to fill the chest: Baptis.
Tremulous after eating at night, with anguish: Rhus tox.
Conscious over the whole body, with out-pressing in hands and arms, as if blood would burst through the vessels: Lilium.
Nervous: Naja trip.
Stopped: Chin. ars., Cicuta vir., Digit.
Motionless: Thea.
Transfixed: Cereus bon. (as by a bolt).
Hurried: Lilium.
Beating: Jacea, Lauroc., Pulsat.
Like waves: Jacea. (See Spigel.)
Interrupting sleep; old maids: Pulsat.
Buzzing: Cyclam.
Purring: Glonoin., Spigel.
And noise when lying: Glonoin.
Not synchronous with the pulse: Spigel.
Sawing (sound): Lobel.
Strumming: Kalmia (every beat has a strumming, as if it would burst, along the sternum).
Scraping: Bufo.
Quivering: Sepia.
Tremor: Absynth. (felt towards the back).
Tremulous: Calcar., Valer.
Trembling: Ananth., Bufo, Nux mosch., Lithium, Rhus, Staphis.
With numbness and lameness of the left arm: Rhus.
Fluttering: Naja trip., Nux mosch., Lauroc., Lilium, Lithium, Physos., Natrum mur., Strychnin.
With gasping for breath: Lauroc.
And general faint feeling, hurried and forced feeling about the apex; awakes her at night, with cold hands and feet, covered with cold sweat; with sharp, quick pain in the heart: Lilium.
With faint feelings, worse lying down: Natr. mur.
Gurgling: Bellad. (with a kind of palpitation going up-stairs).
Clucking: Phytol. (rising to throat, preventing respiration).
Drawing: Agar. (in region of the diaphragm, sharp pains in left side).
Crawling: Canthar. (stitch, followed by a crawling sensation).
Tingling: Acon. (with fainting) Tarant.
Formication: Ananth.
Numbness: Actea, Laches., Rhus tox.

In left arm as if bound to the side: Actea.
Left arm: Actea, Laches.
And lameness: Rhus tox.

Prickling: Ver. vir.

Twitchings: Argent., Camphora, Stramon.
Painless, of the whole cardiac muscle, especially lying on the back; fears apoplexy: Argent.

Cramping: Ananth., Kali carb.

Colic-like: Crocus.

Boiling and bubbling: Lachnanth. (in chest and cardiac region).

Burning: Ananth., Cereus bon., Æscul., Kali carb., Opium, Pulsat., Rumex, Ver. vir.

Heat: Lachnanth., Naja trip.
In the chest and around the heart: Lachnanth.

Warmth: Cann. sat., Crocus, Tereb., Valer.
With violent beating of the heart on moving the body and on stooping: Cann. sat.

Coldness: Arnica, Camphora, Kali bichr., Natr. mur., Oleand., Petrol.
And irresistible sleepiness: Camphora.
And tightness of chest: Kali bichr.

Bruised: Arnica.

Lameness: Phytol., Rhus.

Lump: Agar., Ambra (under the sternum, with pain).

Jerking: Crot. tigl.: Sumbul.

Shock: Arnica, Graphit., Lith. carb., Mang. ac.
Like an electric shock from the heart to front of neck: Graphit.
Sudden shocks in the heart and in the left side of the chest from above downward: Mang. ac.

Feels the heart beat: Bar. carb., Calc. phosph., Laches., Mur. ac.
Of the pulse not frequent, but quick; while sitting feels it in the nape of the neck and left chest: Calc. phosph.
Felt in the face: Mur. ac.
In his head while lying: Lachnanth.

Painful: Ananth.

Needle-like: Iber. (as if a needle were crosswise in the ventricle and pricked at each contraction.)

Sharp: Iber.

Lancinations: Ananth., Bufo.

Torn: Tarant.

Sticking: Iber.

Drawing: Crocus.

Throbbing: Scuttel.

Paralyzed: Ananth., Cereus serp.
At 9.50 P.M., Cereus serp.

Uneasiness: Chin. sulph., Digit., Jatropha, Naja trip., Thea.

Distress: Lyc. virg., (scarcely amounting to pain, most marked at the apex, after rising.)

Feels as though the heart stopped beating: Aurum, Cicuta, Lobel., Lycop., Rumex.
And then suddenly gave one hard thump: Aurum.
Sometimes a faint feeling therewith: Cicuta.
Heart seems as if it suddenly stopped beating, followed by a heavy throbbing through the chest: Rumex.
Sensation as if the circulation stood still, or ebullitions: Lycop.
Short sensation as if the heart would stand still; deep in above the heart, a pain: Lobel.

Concomitants.

With pain: Agar., Ailanth., Arnica, Canthar., Iber., Jacea, Kali carb., Lilium, Lobel., Phytol., Rhus, Tarant., Tabac.
Under the sternum: Agar.
Sharp pain in left side, with drawing in the region of the diaphragm: Agar.

Dull pain and contracted feeling in the region of the heart: Ailanth.
Bruised: Arnica.
Stitch followed by a crawling sensation: Canthar.
Stitches: Jacea.
Cramping, as if the heart was hanging by bands: Kali carb.
Sharp, quick pains in the left chest, awakened from sleep with a hurried and forced feeling about the apex: Lilium.
With pain in the chest: Tarant.
With oppression and pain about the shoulders: Tabac.
With pain between the shoulders: Tabac.
With occasional sharp, stinging pains in the region of the heart, passing from before backward and lasting but a short time: Iber.
Deep in above the heart, a pain, violent, with sawing sound about the heart, diarrhœa, vomiting: Lobel.
Lameness: Phytol., Rhus.
With palpitation: Acon., Angus., Aspar., Ambra, Bovista, Crocus, Curare, Iber., Jatropha, Ledum, Phosphor., Phytol., Physos., Sumbul, Tabac.
When sitting or standing, with a painful sensation as if the heart was contracted: Angust.
With oppression of the chest: Aspar.
With heaviness of the heart: Curare.
With pain between the shoulders: Tabac.
With tightness of the throat: Tabac.
With pain and contraction of chest: Tabac.
Mostly without palpitation: Physos.
With a feeling as if boiling water was being poured into the chest: Acon.
As if the heart was working in water after going up-stairs: Bovista.
As if a lump lay there, or the chest was stuffed up: Ambra.
With pushing or pressure at left edge of sternum: Ledum.
Dyspnœa, with inability to exert himself: Phosphor.
With clucking sensation, rising to the throat, preventing respiration: Phytol.
With choking sensation: Physos.
With faintness by motion: Physos.
With vertigo: Physos., (towards evening, especially when changing position).
With faintness: Strychnin.
With pulse slow and full, then accelerated, hard and dicrotic: Ananth.
With death-like weakness: Ananth:
With protrusion of mucous membrane of right side of anus: Chin. sulph.
With a sensation of weakness in the forearm, all the evening: Digit.
With collection of water in the mouth: Tereb.
With headache: Naja trip.
With rising in the throat: Naja trip.
With restlessness, tossing about: Physos.
With dry heat all over: Physos.
With orgasm: Chin. sulph., Physos., Scutel., Sumbul, Valer.
With fainting: Acon. (with tingling).
With faint feeling: Cicuta, Lilium, Natr. mur.
Feels as if the heart stopped beating: Cicuta.
General, with a hurried and forced feeling about the apex, better sitting still: Lilium.
With orthopnœa: Phosphor.

With dyspnœa: Bellad., Kali bichr., Lauroc., Tabac.
And anxiety: Bellad.
Gasps for breath: Lauroc.
With stitches: Canthar., Jacea.
With irresistible sleepiness: Camphora.
With tightness of the chest: Kali bichr., Tabac.
With (sometimes) slight cough: Lauroc.
With cold hands and feet covered with sweat: Lilium.
With diarrhœa: Lobel.
With vomiting: Lobel.

Pulse Characters Accompanying Sensations.

Accelerated: Ananth.
Full: Ananth.
Slow: Ananth.
Tumultuous: Amyl nitr.
Dicrotic: Ananth.
Violent: Cann. sat., Sepia.
Hard: Acon., Kalmia.
Strong: Acon., Kalmia.
Small: Asaf.
Contracted: Acon.
Weak: Tabac.
Irregular: Acon., Tabac.
Intermittent: Argent., Glonoin., Kalmia.
Strong, quick heart-beat. The third or fourth beat is hard, and is followed by an intermission: Kalmia.

Aggravations and Determining Causes.

Time.

Morning: Lyc. virg., Strychnin.
Forenoon: Chin. sulph., Physos.
Afternoon: Chin. ars., Chin. sulph.
Towards evening: Naja trip., Scutel.
Evening: Digit., Pulsat., Sumbul, Tabac., Tereb.
Night: Arsen., Calcar., Cereus serp., Jatropha, Physos., Tabac., Lilium, Mercur.
With anguish: Calcar.
Awakes her: Lilium.

Position.

On bending forward: Agar. (pressure).
On bending forward when sitting: Jacea.
On stooping: Canthar. sat.
When sitting: Calc. phosph., Jacea, Physos.
Feels the beating of the heart in the nape of the neck and left chest: Calc. phosph.
After rising: Lyc. virg.
When lying: Glonoin., Jacea, Lachnanth., Natr. mur.
Beating like waves: Jacea.
Then feels the beating of his heart in his head: Lachnanth.
With the head low: Glonoin., Spongia.
When lying on the back: Argent.
When lying on the left side: Glonoin.

Motion.

Turning to the left side: Iber.
Motion: Physos. (faintness).
On moving the body: Cann. ind.
Moving slowly about the room: Jatropha.
When going up-stairs: Bellad.
After going up-stairs: Chin. sulph., Bovista.
Visible palpitation, as if the heart was working in water: Bovista.
When walking: Cicuta vir., Naja trip.
After a walk: Rhus.

Eating and Drinking.

After eating: Aspar., Calcar.
After dinner: Sepia.
After drinking stout: Sumbul.

Exertion.

Exertion causes strong beating, worse when noticing it: Argent.
After overexertion: Bovista.
While writing; Naja trip.

Sleep.

Wakes from sleep at night: Lilium, Mercur., Phytol., Sepia.
With trembling and agitation, as if frightened: Mercur.
With lameness near the heart, worse during expiration: Phytol.
With violent beating of the heart: Sepia.
Interrupting sleep: Phytol.

Unclassifiable.

During expiration: Phytol.
When loudly spoken to: Camphora (distress).
Worse when the fresh air strikes him: Physos.
During the flush of heat: Sumbul.
Trying to sing: Naja trip.
After incomplete stool: Chin. sulph.
After postponed stool: Chin. sulph.

AMELIORATIONS.

Position.

When head is high: Glonoin., Rumex, Spongia.
In a recumbent sitting position: Physos.
Lying on the back: Physos.
When lying on the right side: Glonoin., Laches., Tabac.
Sitting still: Lil. tigr., (hurried and forced feeling about the apex).

Miscellaneous.

From Yawning: Crocus, Tarant.

PAINS.

Abrotanum: Across the chest, sharp and severe in the region of the heart.
Aconite: Stitches of the heart; lies on the back, with raised shoulders; constriction of chest.
Actea: From the region of the heart, all over the chest and down the left arm palpitation; unconsciousness; cerebral congestion; dyspnœa; cold sweat on the hands; numbness of the body; the left arm numb and as if bound to the side.
Æsculus: Darting in the region of the heart, with fulness and palpitation. Dull, aching, burning in region of the heart.
Agaricus: Burning, shooting pains in the region of the heart, extending to left shoulder-blade; caused by deep inspiration, and much worse from coughing, sneezing, hiccough.
Ailanthus: Dull pain and contracted feeling in the region of the heart and through the centre of the left lung.
Aloes: Strong beat of the heart occasionally; pain through to left scapula.
Ammonium mur.: Tearing in the region of the heart, going from there into the left forearm.
Amyl nitr.: Pain and constriction around the heart; an aching pain. Dull pain in the heart.
Anacardium: Stitch in the region of the heart, during inspiration, at night. Stitches piercing through and through at

the heart; each time two quickly succeeding each other.

Anantherum: Stitches and formication in the heart, with great anxiety. Lancinations, cramps and weakness of the heart, which seems too full of blood and unable to beat, with oppression; pulse slow and full, then accelerated, hard and dicrotic. Stitches and cramps in the heart, with sensation as if its apex were pinched very hard. Heavy and painful heart.

Angustura: Violent palpitation of the heart when sitting or stooping, with a painful sensation as if the heart was constricted. Painful thrust in the region of the heart.

Apis: Sudden attack of acute pain just below the heart, soon extending diagonally towards the right chest.

Argentum nitr.: Pains about the heart; can hardly breathe; choking.

Arnica: Stitches in the cardiac region. Pain from liver through left chest and down left arm; veins on the hand swollen, purplish; pain as if the heart were squeezed, or as if it got a shock.

Arsenicum: Sudden tightness about the heart; agonizing præcordial pain; pains into the neck and occiput; anxiety, oppression; breathing difficult, fainting spells; least motion makes him loose his breath; sits bent forward or with head thrown back: worse at night, especially from 1 to 5 P.M.

Asclepias tub.: Constrictive pain of the heart. Lancinating pain near the heart. Repeated lancinations in the heart and intercostal muscles (right side, 6 P.M.). Pain in the heart as from the prick of a pin.

Asparagus: Slight sensation of stitches in the region of the heart, after eating.

Aurum: Pain in the region of the heart, extending down the left arm to the fingers.

Benzoic ac.: Pains change place incessantly, but are constant about the heart.

Berberis: Stitches about the heart.

Bromium: Cutting pains running upward.

Bryonia: Stitching pain in the region of the heart. Cramp in the region of the heart, aggravated by walking, raising one's self or using the slightest exertion, even raising the arm.

Bufo: Lancinating and pulling in the region of the heart, as if it were being distended. Pains as if pins were thrust into the apex of the heart.

Cactus: Pricking pain, impeding breathing and the movements of the body; oppression, cannot lie on the left side; blue face, pulse quick, strong, tense and hard. Dull, heavy pain, worse from pressure; suffocating respiration; face blue, œdema, especially of the left hand and of the legs to the knees; feet icy cold; pulse intermittent. Pains in the apex of the heart, shooting down left arm to the ends of the fingers; feeble pulse; dyspnœa.

Cannabis ind.: Pressing pain in the heart, with dyspnœa the whole night. Piercing pain in the heart. Stitches in the heart, accompanied by great oppression, the latter relieved by deep breathing.

Cantharis: Drawing pain in the region of the heart. Stitch in the heart followed by a crawling sensation.

Causticum: Stitches about the heart.

Cereus bon.: At night, when retired, felt severe convulsive pains at the heart; severe agonized pain for several hours, which returns towards morning. Slight pricking pain at the heart.

Cereus serp.: Feel pain at the heart after retiring. Pains at the heart after exertion, followed by shortness of breath, relieved after taking a full inspiration. Momentary pain at the heart. Afternoon, short, sharp pain through the heart. Thrusting pain at the heart, followed by sighing respiration.

Centaurea tag.: Lancinations as from a thorn driven into the heart.

Chininum sulph.: Sticking in the region of the apex, disappearing after a few minutes.

Cicuta vir.: Burning and sticking pains in the præcordium.

Clematis: Sharp stitches in the region of the heart from within outward.

Colocynthis: Stitches in the cardiac region.

Crocus: Stitches beneath the heart, aggravated by inspiration.

Croton tigl.: Stitches in the præcordial region on expiration, repeated after one hour. Frequent stitches in the præcordial region. Some jerkings in the left side of the heart.

Curare: Lancinating and distensive pains in the region of the heart.

Cuprum: Stitches below the heart. Boring pain in the region of the heart.

Cyclamen: Stitches about the apex.

Euphrasia: Violent pain in the heart, in the afternoon. Violent, long-continued pain in the heart, with audible palpitation, in the afternoon. Some fine stitches in the præcordia, on inspiration and expiration, in the evening, while sitting.

Fluoric acid: Sore pain at the heart.

Glonoinum: Sharp pains at the heart.

Graphites: Stitches.

Hamamelis: Pricking pain in the heart and superficial veins of both arms.

Hepar: Fine stitches in the heart and left half of the chest, with palpitation.

Hydrocyanic ac.: Præcordial anxiety, alternating with slight vertigo, pain in the same locality, not increased by pressure. Transient stitches in the right side of the heart.

Iberis: Slight pain over the region of the heart. Much pain over the base of the heart. A constant, dull pain the heart, worse lying down. Sharp, sticking pain in the region of the heart. On turning on the left side, a sharp, sticking pain is felt as if a needle were crosswise in the ventricles and pricked at each contraction.

Iodium: Constant, heavy, oppressive pain in region of heart.

Jacea (Viola tricolor): Oppression and stitches in the heart on bending forward when sitting.

Jaborandi: Pains in the region of the heart.

Kali bichr.: Pricking pain in the region of the heart.

Kali carb.: Cramping pains, as if the heart was hanging by bands.

Kali cyan.: Stitches in the heart and lungs. Jerking stitches in the heart on respiration.

Kali jod.: Darting pain in the heart, when walking; after abuse of mercury: after repeated endocarditis.

Kali nitr.: Violent stitch in the præcordial region.

Kalmia: Wandering rheumatic pains in the region of the heart; shooting pains above the heart through to scapula. Severe pain in the cardiac region, with slow, small pulse.

Kreosote: Stitches over the heart; in the heart.

Lachnanthes: Stitches in the heart, with anxiety.

Laurocerasus: Stitches in the region of the heart.

Leptandra: Soreness in the cardiac region.

Lilium: Heart feels as if grasped, with pain and heaviness of left mamma to scapula. Constrictive pain about the heart extending through to scapula.

Lithium carb.: Violent pain in the heart as she bent over the bed, in the morning after rising. Rheumatic soreness in the cardiac region. Pains in the heart before and at the time of urinating; also before and at time of menses.

Lobelia: Slight, deep-seated pain in the cardiac region. Short sensation as if the heart would stand still; deep in above the heart, a pain.

Lycopodium: Pulsating tearing in the region of the heart.

Lycopus virg.: Constrictive pain and tenderness around the heart. Acute darting pains in the heart, with complete intermissions, lasting fully an hour. Subacute pain at apex of the heart, during the day; repeated sharp, superficial and deep pains in the præcordial region, during the afternoon; subacute pain in the præcordial region and left frontal eminence, at 1 P.M.; darting pain in the apex of the heart, in the evening.

Magnesia mur.: Stitches in the heart arresting the breath.

Menyanthes: Drawing pain in the region of the heart, after eating. Violent, persistent stitch in the region of the heart, increased by holding the breath.

Mercurius cor.: Pain in the præcordial region.

Mercurius jod. rub.: Sharp, cutting pain in the chest and sticking pain in the heart.

Muriatic ac.: Stitches in the heart.

Naja trip.: After riding some distance had considerable pain at the heart, extending through to the left scapula; pain in the chest is not affected by deep inspiration. Complained of a great pain near the heart.

Natrum carb.: Painful cracking in the region of the heart.

Oleander: Dull, drawing pain over heart, worse when stooping.

Oxalic ac.: Pain in the heart; soreness, stitches from behind forward, or from above downward. Sharp, darting pain in the heart and left lung, extending down to epigastrium.

Phosphoric ac.: Stitches through the heart.

Physostigma: Dull pain in the region of the heart, lasting nearly an hour.

Phytolacca: Shocks of pain in the cardiac region (angina pectoris); pain goes into right arm.

Plumbum: Stitches during inspiration.

Pulsatilla: Catching pain in the cardiac region, better for a time from the pressure of the hand.

Rhododendron: Boring pain in the region of the heart.

Rhus tox.: Numbness and lameness of the left arm.

Rhus ven.: Stitches in the heart. Palpitation, with stitches in the heart.

Sanguinaria: Painful stitches or

pressing pain in region of the heart.

Scutellaria: Occasionally a sticking pain in the region of the heart, in the evening.

Spigelia: Stitches about heart, sometimes synchronous with the pulse; with anxiety and oppression.

Spongia: Contracting pain in the chest, heat, suffocation, faintness and anxious sweat. Stinging, pressing pains in the præcordia.

Strychninum: During the day dull pain shifting along the line of the aortic arch.

Sulphuric ac.: Shooting through the heart.

Tabacum: Suffered chiefly at night, from paroxysms of præcordial oppression, with palpitation and pain between the shoulders. One morning was suddenly seized with pain in the region of the heart, with transverse constriction in the upper part of the chest; he could neither walk nor speak; the pulse was insensible; the hands cold; the attack continued half an hour. Darting pain, extending from the heart upward to the vertex, a sensation of constriction across front of upper chest, with dyspnœa and disposition to take a full inspiration. Aching pain in the cardiac region, generally worse at night, with frequent intermissions of the pulse and of the heart's action. Palpitation and pain in the cardiac region. For some time he suffered from palpitation; with pain and constriction of the chest, which came on in the form of an attack either in the evening or night; afterwards a similar attack from inhaling the fumes.

Tarantula: Oppression and pain in the heart as if a misfortune had happened, with weeping and moaning, followed by cramps and coldness in the extremities. Pain in the heart as if squeezed or compressed, also in the aorta, under the left clavicle and carotids; with violent throbbing of these arteries and heart. Pain as if the heart and aorta were torn, with a tingling sensation. Severe pain in the aorta extending to the subclavian, as if it was going to burst, with slight beating of the heart. Sensation as if the heart turned and twisted around, with pain in the chest and general perspiration. Pressive pain in the heart and aorta, with violent throbbing. Pressive pain in the whole region of the heart, with severe headache and a great deal of moaning in the night. Pressive pain in the region of the heart, worse by touching. Shooting pain in the heart and arteries of the left side of the chest, extending to the left arm. The sensation of these parts is so increased that the contact of the dress is very painful. Palpitation of the heart, stitches interfering with breathing; pain in the back, painful feeling in the spinal column. Painful throbbing of the carotids, with fulness in the head, especially in the region of the medulla oblongata, relieved by epistaxis.

Tellurium: Dull pain in the region of the heart when lying on left side; better when lying on the back.

Thea: Acute pain as from a spasm in the region of the heart; and, in spite of all his efforts, he

felt as if he were continually falling into deliquium. Violent palpitation and considerable pain.

Theridion: Sharp pains radiate to arm and left shoulder.

Ustilago: Burning pain in cardiac region.

Valeriana: Stitches in the region of the heart. (Hering.) Sudden stitches in the region of the heart when sitting or standing, abating when stooping, only during an inspiration. (Allen.)

Veratrum vir.: Prickling; dull aching.

Zincum: Severe pain in the cardiac region, some swelling and great tenderness.

Character of Pain.

Agonizing: Arsen., Cereus bon.

Violent: Euphras., Kali nitr., Lithium, Menyanth.

As she bent over the bed in the morning after rising: Lithium.

Sharp: Abrot., Cereus serp., Glonoin., Iber., Lyc. virg., Merc. jod. rub. (cutting), Therid.

Aching: Æscul. (dull), Amygd. am., Tabac.

Acute: Apis, Lyc. virg., Thea.

Sudden attacks: Apis.

Subacute: Lyc. virg.

Severe: Abrot., Cereus bon., Kalmia, Tarant., Zincum.

With slow, small pulse: Kalmia.

With some swelling and great tenderness: Zincum.

Piercing: Anac., Cann. ind.

Tearing: Amm. mur., Lycop. (pulsating).

Pulsating: Lycop. (tearing).

Bursting: Tarant.

Shooting: Agar., Kalmia, Sulph. ac., Tarant.

In the heart and arteries of the left side of the chest: Tarant.

Sticking: Chin. sulph., Curare, Iber., Scutel., Merc. jod. rub.

A sharp, sticking pain is felt as if a needle were crosswise in the ventricle and pricked at each contraction: Iber.

Stitches: Acon., Anac., Ananth., Arnica, Aspar., Berber., Bryon., Cann. ind., Canthar., Caustic., Clemat., Coloc., Crocus, Crot. tigl., Cuprum, Cyclam., Euphras., Graphit., Hepar, Hydr. ac., Kali cyan., Kali nitr., Jacea, Kreos., Lachnanth, Lauroc., Magn. mur., Menyanthes, Mur. ac., Oleand., Phosph. ac., Rhus ven., Sanguin., Spigel., Tarant., Valer.

About the heart: Caustic.

About the apex: Cyclam.

Below the heart: Cuprum.

Over the heart: Kreos.

In the heart: Kreos.

Through the heart: Phosph. ac.

Piercing through and through at the heart, each time two quickly succeeding each other: Anac.

Sometimes synchronous with the pulse: Spigel.

Sharp, from within outward: Clemat.

From behind forward or above downward: Ox. ac.

Lies on the back with raised shoulder: Acon.

And oppression on bending forward when walking: Jacea.

During inspiration: Plumbum.

During inspiration, at night: Anac.

Arresting his breath: Magn. mur.

Accompanied by great oppression, the latter relieved by deep breathing: Cann. ind.

Followed by a crawling sensation: Canthar.

Fine, and in left half of chest: Hepar.

With anxiety: Ananth., Lachnanth.

Or pressing pain: Sanguin.
Interfering with breathing: Tarant.
And formication in the heart, with great anxiety: Ananth.
And cramps in the heart, with sensation as if its apex were pinched very hard: Ananth.
Slight, in the region of the heart, after eating: Aspar.
Fine stitches, worse on inspiration and expiration: Euphras.
Jerking stitches in the heart on respiration: Kali cyan.

Thrust: Angust., Bufo, Cereus serp.
Painful thrust in the region of the heart: Angust.
Followed by sighing respiration: Cereus serp.

Catching: Pulsat.

Cutting: Bromium, Merc. jod. rub. (sharp).

Darting: Æscul., Kali jod., Lyc. virg., Tabac.
With fulness and palpitation: Æscul.
When walking: Kali jod.

Drawing: Canthar., Menyanth., Oleand. (dull).

Oppressive: Iodum.

Pressing: Cann. ind., Glonoin., Sanguin., Spongia.
As if contracted: Glonoin.
Or stitches: Sanguin.

Constriction: Amyl. nitr., Asclep. tub., Angust., Lilium, Lyc. virg., Tabac.
Pain and constriction about the heart: Amyl. nitr.

Contracting: Spongia.

Squeezed: Arnica, Tarant.

Pulling: Bufo.
Lancinating and pulling in the region of the heart, as if it were being distended: Bufo.

Jerking: Crot. tigl.

Torn: Tarant.
As if the heart and aorta were torn, with tingling sensation: Tarant.

Boring: Cuprum, Rhodod.

Superficial: Lyc. virg.

Deep-seated: Lobel., Lyc. virg.

Dull: Æscul.. Ailanth., Amyl nitr., Cactus, Iber., Oleand., Physos., Tellur., Strychnin., Ver. vir.
And contracted feeling: Ailanth.
And drawing when stooping: Oleand.

Heavy: Cactus, Iodum, Lilium.

Wandering: Benz. ac., Kalmia.

Shock: Arnica, Phytol.

Cramping: Bryon., Kali carb. (as if heart was hanging by bands; burning).

Stinging: Spongia.

Pricking: Cactus, Cereus bon., Hamam., Kali bichr.
Impeding breathing and the movements of the body: Cactus.
And in superficial veins of both arms: Hamam.

Burning: Æscul., Agar., Cicuta vir., Ustil.

Tenderness: Zincum, Lyc. virg.

Soreness: Fluor. ac., Lauroc., Lithium, Ox. ac.

Rheumatic: Kalmia, Lithium.

Lancinations: Ananth., Ascl. tub., Bufo, Cent. tag., Curare.
As from a thorn driven into the heart: Cent. tag.

Cramps: Ananth.

Compressed: Tarant.
Pain in the heart as if squeezed or compressed, also in the aorta, under the left clavicle and carotid: Tarant.

Like the prick of a pin: Ascl. tub., Bufo.
Pains as if pins were thrust into the apex of the heart: Bufo.

Throbbing: Tarant.

Convulsive: Cereus bon.

Distensive: Curare.

Pressive: Tarant.

Duration of Pains.

Momentary: Cereus serp.

Short: Cereus serp.
Disappearing after a few minutes: Chin. sulph.
Pricked at each contraction: Iber.
Repeated after an hour: Crot. tigl.
Long continued: Euphras.
Constant: Benz. ac., Iber., Iodine.
With complete intermissions: Lyc. virg.
Lasting fully an hour: Lyc. virg.
During the day: Lyc. virg., Strychnin.
Repeated: Lyc. virg.
Persistent: Menyanth.
Lasting nearly an hour: Physos.
Continued half an hour: Tabac.
Occasionally: Scutel.
Paroxysms: Tabac.

Concomitants.

With anxiety: Ananth., Arsen., Hydr. ac., Lachnanth., Spigel., Therid.
  Alternating with slight vertigo: Hydr. ac.
With oppression: Ananth., Arsen., Cactus, Cann. ind., Jacea, Spigel., Tabac., Tarant.
With fainting spells: Arsen.
With palpitation: Angust., Euphras., Rhus ven., Tabac., Tarant., Thea.
  Violent palpitation when sitting or stooping, with a painful sensation as if the heart was constricted: Angust.
  Audible palpitation, in the afternoon: Euphras.
With dyspnœa: Actea, Argent., Arsen., Cactus, Cereus serp., Magn. mur., Tabac.
  Least motion makes him lose his breath: Arsen.
  Stitches arrest his breathing: Magn. mur.
With numbness (Actea) of whole body, the left arm numb, and as if bound to the side.
With heat: Spongia.
With anxious sweat: Spongia.
With cold sweat on the hands: Actea.
With icy cold feet: Cactus.
With blue face: Cactus.
With choking: Argent.
With sudden tightness above the heart: Arsen.
With constriction of the chest: Acon.
With œdema, especially of the left arm, and of the legs to the knees: Cactus.
With pain between the shoulders: Tabac.
With inability to walk or speak: Tabac.
With insensible pulse: Tabac.
With cold hands: Tabac.
With disposition to take a full inspiration: Tabac.
With frequent intermissions of the pulse: Tabac.
With weeping and moaning: Tarant.
  Followed by cramps and coldness in the extremities: Tarant.
With violent throbbing of the carotids and heart: Tarant.
With slight beating of the heart: Tarant.
With sensation that the heart turned and twisted around: Tarant.
With severe headache: Tarant.
With a great deal of moaning in the night: Tarant.
With fulness in the head: Tarant.
With the veins on the arms swollen purplish: Arnica.
With some swelling and great tenderness over the heart: Zincum.

Special Localization of Pain.

Near the heart: Ascl. tub., Naja trip.

In the region of the heart: Angust., Bufo, Crot. tigl., Curare, Euphras., Hydr. ac., Iber., Jabor., Kali nitr., Lyc. virg., Menyanth., Physos., Scutel., Tabac., Tarant., Thea, Valer.
Not increased by pressure: Hydr. ac.
And left frontal eminence: Lyc. virg.
Whole region of the heart: Tarant.
At the heart: Cereus bon., Cereus serp., Naja trip.
Extending through to the left scapula: Naja trip.
Around the heart: Amyl nitr.
And constriction: Amyl nitr.
About the heart: Benz. ac., Lyc. virg.
Pains change place incessantly, but are most constant about the heart: Benz. ac.
Over the region of the heart: Iber.
Over the base of the heart: Iber.
About the base of the heart: Agar.
Above the heart: Arsen., Kreos., Kalmia.
Tightness: Arsen.
Deep in: Kreos. (short sensation, as if the heart would stand still).
In the aorta: Tarant.
Below the heart: Apis, Cuprum.
Beneath the heart: Crocus.
Over the heart: Kreos.
Through the heart: Cereus serp.
Into the heart: Cent. tag.
In the heart: Ananth., Ascl. tub., Euphras., Iber., Kali cyan., Kreos., Lyc. virg., Merc. iod. rub., Rhus ven., Tarant.
Stitches and formication: Ananth.
And intercostal muscles: Ascl. tub.
As from the prick of a pin: Ascl. tub.
And lungs: Kali cyan.
With palpitation: Rhus ven.
Constant: Merc. iod. rub.
In the region of the apex: Chin. sulph.
Apex: Ananth., Bufo, Lyc. virg.
In the apex: Bromium, Cactus.
About the apex: Cyclam.
In the left side of the heart: Crot. tigl. (jerkings).
In the right side of the heart: Hydr. ac.
Under the left clavicle: Tarant.
In the carotids: Tarant.
In the back: Tarant.
In the region of the medulla oblongata: Tarant.
Between the shoulders: Tabac.
Left frontal eminence: Lyc. virg.
In the chest: Tarant.
And general perspiration: Tarant.
Left side of the chest: Tarant.
In the left mamma: Lilium.
In left lung: Merc. iod. rub., Ox. ac.
In the centre of left lung: Ailanth.
Across the chest: Abrot.
Over the whole chest: Actea, Hepar.
And left half of the chest: Hepar.

Direction and Course of Pains from the Præcordial Region.

Through to left scapula: Agar., Aloes, Kalmia, Lilium, Naja trip.
Extending to the left arm: Tarant.
Down the left arm: Actea, Arnica, Arsen., Bromium.
Radiate to arm and left shoulder: Therid.
To left forearm: Amm. mur.
To the fingers: Aurum.
From the apex to the ends of the fingers: Cactus.
Into the right arm: Phytol.
In the superficial veins of both arms: Hamam.
Through the heart: Anac., Bro-

mium, Cereus bon., Phosph. ac., Sulph. ac.
Into the heart: Cent. tag.
Running upward: Bromium.
From within outward: Clemat.
From behind forward or above downward: Ox. ac.
Into the neck and occiput: Arsen.
From the liver to the left chest and down the left arm: Arnica.
Over whole region of the heart: Tarant.
Change place incessantly, but are most constant about the heart: Benz. ac.
And intercostal muscles: Ascl. tub.
And left frontal eminence: Lyc. virg.
Shifting along the line of the aortic arch: Strychnin.
Transverse constriction in the upper part of the chest: Tabac.
Extending from the heart upward to the vertex: Tabac.
In the aorta, extending to the subclavian, as if it were going to burst: Tarant.
Extending diagonally across the right chest: Apis (from just below the heart).
In left lung extending down to the epigastrium: Ox. ac.
Through the centre of left lung: Ailanth.
When the pains suddenly leave the limbs and go to the heart: Kalmia.

Aggravations.

Time.

Towards morning: Cereus bon.
In the morning: Lith. carb., Tabac.
After rising: Lith. carb.
During the day: Lyc. virg., Strychnin.
In the afternoon: Cereus serp., Euphras., Lyc. virg.
At 1 P.M.: Lyc. virg.
In the evening: Euphras., Lyc. virg., Scutel., Tabac.
At night: Anac. orient., Arsen., Cann. ind., Cereus bon., Cereus serp., Tabac., Tarant.
Especially from 1 to 5 P.M.: Arsen.
The whole night: Cann. ind.
When retired: Cereus bon.
After retiring: Cereus serp.

Motion.

Least motion: Arsen.
Makes him lose his breath: Arsen.
From walking: Bryon.
When walking: Kali iod.
After riding: Naja trip.
Raising one's self: Bryon.
Raising the arm: Bryon.

Position.

While sitting: Euphras.
When sitting or standing Valer.
Lying down: Iberis, Cereus serp.
After retiring: Cereus serp.
Turning on the left side: Iber.
Lying on the left side: Cactus, Tellur.
On bending forward when sitting: Jacea.
When stooping: Oleand.

Eating and Drinking.

After eating: Aspar., Menyanth.

Contact.

Touch: Tarant.
Worse from contact of dress: Tarant.

Sleep.

After retiring: Cereus serp.
When retired: Cereus bon.
After rising: Lith. carb.
In the morning Lith. carb.

Pressure.

From pressure: Cactus grand.

Exertion.

Using the slightest exertion: Bryon.

After exertion: Cereus serp.
After riding: Naja trip.

Respiration.

Caused by deep inspiration: Agar.
From inspiration: Chin. sulph.
During inspiration: Anac. orient., Plumbum.
At night: Plumbum.
Only during an inspiration: Valer.
On inspiration or expiration: Euphras.
On respiration: Kali cyan.
On expiration: Crot. tigl.
Holding the breath: Menyanth.
From coughing: Agar.

Miscellaneous.

From sneezing: Agar.
From hiccough: Agar.
Before and at the time of urinating: Lith. carb.
Before and at the time of the menses: Lith. carb.

AMELIORATIONS.

From lying on the back: Acon., Tellur.
With raised shoulders: Acon.
From sitting bent forward with the head thrown back: Arsen.
When stooping: Valer.
From deep breathing: Cann. ind., Cereus serp.
Oppression: Cann. ind.
By taking a full inspiration: Cereus serp.
From pressure of the hand: Pulsat.
For a time: Pulsat.
From epistaxis: Tarant.

CLINICAL SYMPTOMS.

Abrotanum: Pain across chest, sharp and severe. Rheumatism. Pulse weak and small. Chlorosis. Ebullitions, with general heat, and distended veins on the forehead and head. Hæmorrhoidal colic.

Aconite: Pulse full, hard and strong in fevers, inflammations; small, intermittent, irregular, in asthma, quicker than the beat of the heart; quick, hard in peritonitis; full, hard and frequent, succeeding chill, during which it was small and weak.

Adonis vern.: Has removed dropsy dependent upon cardiac disease, primary or secondary.

Adonis æstivalis: Has proven palliative in cases of insufficiency of heart-action, with feeble, irregular, rapid pulse, and diminished arterial pressure.

Ailanthus: Pulse rapid and small; weak, sometimes scarcely perceptible. Scarlatina.

Ammonium carb.: Audible palpitation, with attacks of great anxiety, as if dying; cold sweat, involuntary flow of tears; loud, difficult breathing and trembling of hands. Angina pectoris.

Antimonium tart.: Great præcordial excitement, with vomiting of mucus and bile.

Apis: Blowing sound with the diastole.

Apocynum: Pulse 45 between attacks of vomiting; feeble. Metrorrhagia.

Arnica: "Strain" of the heart from violent running. Fatty degeneration of the heart. (Bromium).

Arsenicum alb.: Angina pectoris; sudden tightness above the heart; agonizing præcordial pain; pains into the neck and

occiput; anxiety, oppression, breathing difficult; fainting spells; least motion makes him lose his breath; sits bent forward or with the head thrown back, worse at night, especially from 1 to 5 A.M. Hydropericardium, with great irritability, anguish and restlessness.

Asafœtida: Nervous palpitation, with small pulse; from overexertion or suppressed discharges (in women).

Asclepias tub.: Carditis. Pericarditis.

Benzoic ac.: Gout affecting the heart.

Borax: Circulation irregular, face bluish, especially around the mouth, with blue look of finger-ends and feet; with attacks during which the child became prostrated and as if suffocating.

Bromium: Cutting pains running upward. Heart disease.

Cactus: Endocardial murmurs; excessive impulse; increased præcordial dulness; enlarged right ventricle. Palpitation of long standing caused by an unfortunate love affair. Irregularity of the heart's action, at times frequent, at others slow; great irritation of the cardiac nerves; enlarged left ventricle.

Caffeine: Has proved of service in averting impending cardiac failure.

Caladium: Pulse hard and bounding in intermittents; very frequent, hardly to be felt, in typhus.

Carbo veg.: Blood stagnates in capillaries, cyanosis; cold face and limbs; cold sweat; complete torpor; impending paralysis of heart.

Convallaria maj.: Has been used in cardiac dropsies successfully.

Colchicum: Heart disease, following acute rheumatism. Hydropericardium.

Digitalis: Inflammation of pericardium, with copious serous exudation.

Erythrophlœum: Has been used as a cardiac stimulant in mitral disease.

Eupatorium purp.: Pulse accelerated and full. Ague.

Ferrum: Consecutive heart disease. Chlorosis. Hard, strong beating of the heart. Pseudoplethora. Throbbing in all bloodvessels; soft bellows' sound at apex (?). [Base, if anæmic (Snader)].

Gelsemium: Nervous chill, yet skin is warm; wants to be held that she may not shake so. Heart disease.

Glonoinum: Low, feeble pulse in sunstroke. Purring noise in the region of the heart when lying; pulse intermittent; must have head high; worse when lying on left side; better on right.

Helleborus: Frequent and soft, intermittent pulse in hydrocephalus; small, irregular in hydrothorax.

Hydrastis: Pulse slow during the chill.

Jaborandi: In one lad, whose pulse was intermittent, the medicine entirely removed this irregularity.

Kali carb.: Systolic murmur; stitch pain; second tick loud from pulmonary stagnation. Endocarditis. Insufficiency of mitral valves.

Kali iod.: Darting pains in the heart when walking; after abuse of mercury; after repeated endocarditis.

Kalmia: When articular rheumatism has been treated externally and cardiac symptoms ensue. When the pains sud-

denly leave the limbs and go to the heart. Hypertrophy and valvular insufficiency, or thickening after rheumatism. Severe pain in cardiac region, with slow, small pulse. Hypertrophy with dilatation and aortic obstruction. Paroxysms of anguish about the heart, dyspnœa, febrile excitement; rheumatic endocarditis, with consequent hypertrophy and valvular disease. Angina pectoris. Fatty degeneration. Palpitation (gastralgia). Slow, small pulse. Hypertrophy of heart. Remarkable slowness of the pulse, 48 in the minute (neuralgia). Quickened but weak pulse (rheumatism of the heart). Pulse only slightly accelerated and many times slow (acute rheumatism).

Lachesis: Restless, trembling; anxiety about the heart, hasty speech; suffocation on lying down; weight on the chest; heart feels constricted (rheumatism of the heart). Cyanosis neonatorum. Pericarditis, dropsy, diphtheritic patches in the throat after scarlatina.

Lachnanthes: Pulse 110, small, thin hard. Pneumonia.

Laurocerasus: Apoplexy. Cyanosis neonatorum.

Lithium carb.: Valvular deficiencies, worse from mental agitation, which causes a fluttering and trembling of the heart. Rheumatic soreness in the cardiac region.

Lobelia: Sawing sound about the heart, with violent pains, diarrhœa and vomiting.

Lycopodium: Hydropericardium.

Nux mosch.: Pulse small, weak; nun's murmur in the carotids.

Opium: Full and slow, with snoring; imperceptible, face purple. Cyanosis neonatorum.

Oxalic ac.: Sharp, darting pain in heart and left lung, extending down to the epigastrium. Angina pectoris. Heartburn intermits when thinking of it.

Phosphorus: Disease of the right heart, with consequent venous stagnation. Dilatation of the heart following endocarditis or fatty degeneration.

Phosphoric ac.: In children and young persons who grow too fast; after self-abuse.

Phytolacca: Shocks of pain in the cardiac region. Angina pectoris. Pain goes into right arm. Heart's action weak, with constipation.

Platina: Great anxiety and palpitation. Commencing endo- or pericarditis.

Plumbum: Rush of blood to the heart during a rapid walk; anguish, cold sweat; stitches during inspiration. Hypertrophy.

Psorinum: Pericarditis, psoric origin. Rheumatic pericarditis; effusion, cannot lie down.

Pulsatilla: Beating in the chest, interrupting sleep; old maids.

Rhus: Uncomplicated hypertrophy from violent exertion. Organic disease of the heart, with sticking pains and soreness; numbness and lameness of left arm.

Sanguinaria: Irregularity of the heart's action, with coldness, insensibility, etc.

Sparteine: Has been employed in dropsies dependent upon cardiac disease.

Spongia: Angina pectoris; contracting pain about the heart, suffocation, anxious sweat. Aneurism of the aorta; dry, paroxysmal cough, worse lying down. Palpitation violent, with pain, gasping respiration; suddenly awakened after midnight, with suffocation, great

alarm; anxiety. Valvular insufficiency. Rheumatic endocarditis; loud blowing with each heart-beat.

Stramonium: Pulse slow in typhus. Beating of heart so increased from motion he cannot speak for hours; trembling; twitches as in chorea; murmurs instead of regular sounds; consequent on fright.

Tabacum: Palpitation in attacks at night, tight across the chest, with angina pectoris. Oppression at heart; pulse feeble, irregular. Cholera.

Theridion: Anxiety about heart; sharp pains radiate to arm and left shoulder.

Veratrum alb.: Tumultuous irregular contraction of heart, forerunners of paralysis; intermittent action of the heart in feeble persons, with some obstruction to the hepatic circulation. Palpitation in the anæmic; agony of death, legs cold; difficult breathing, better at rest or lying down.

Zincum: Feels as if a cap were over the heart: spine affected.

Diseases of the Heart and Appendages.

Angina pectoris: Am. carb. Arsen., Ox. ac., Phytol., Spongia, Tabac.

Fatty degeneration: Arnica, Kalmia, Phosphor.

Endocarditis: Kali carb., Kalmia, Platin. (commencing), Spigel.

Valvular insufficiency: Kali carb. (mitral), Kalmia (aortic obstruction), Lith. carb., Spongia.

Murmurs: Apis, Cactus, Ferrum, Kali carb., Spigel., Lobel., Nux mosch.

Probably Organic.

Blowing sound with the diastole: Apis.

Systolic: Kali carb.

Systolic at apex; also hard blowing sound with each heart-beat: Spigel.

Probably Inorganic.

Soft bellows' sound at the apex (?): Ferrum. [If anæmic, the murmur should be systolic, and at the base (Snader).]

Nun's murmur in the carotids: Nux mosch.

Sawing sound: Lobel.

Hypertrophy: Kalmia, Plumbum, Rhus (uncomplicated).

Dilatation (enlarged ventricles): Cactus (left), Kalmia, Phosphor. (right).

Cyanosis: Borax, Carbo veg., Lauroc.

Cyanosis neonatorum: Lachesis, Lauroc., Opium.

Pericarditis: Digit., Lachesis, Platin. (commencing), Psorin.

Hydropericardium: Arsen., Colchic., Lycop.

"Heart disease" (character not mentioned): Bromium, Colchic., Gelsem.

"Rheumatism of the heart": Kalmia, Lachesis.

Organic diseases of the heart: Rhus.

"Strain of the heart:" Arnica, Bromium.

Impending paralysis of the heart: Carbo veg., Ver. alb.

Great irritability of the cardiac nerves: Cactus.

Gout of the heart: Benz. ac.

Aneurism of the aorta: Spongia.

Other Diseases.

Apoplexy: Lauroc.

Asthma: Acon.

Chill: Acon., Gelsem., Hydrast.

Cholera: Tabac.
Chlorosis: Abrot.
Constipation: Phytol.
Diarrhœa: Lobel.
Fever: Acon.
Hæmorrhages: Secale.
Hæmorrhoidal colic: Abrot.
Hepatic obstruction: Ver. alb.
Hydrocephalus; hydrothorax: Helleb.
Inflammations: Ars., Acon., Kalmia.
Insensibility: Sanguin.
Metrorrhagia: Apoc.
Neuralgia: Kalmia.
Pain: Abrot., Ars., Kali jod., Kalm.
Pneumonia: Lachnanth.
Peritonitis: Acon.
Pseudoplethora: Ferrum.
Rheumatism: Abrot.
Scarlatina: Ailanth., Lachnanth.
Spine affected: Zincum.
Sunstroke: Glonoin.
Typhus: Calad., Stramon.
Uræmia: Arsen.
Vomiting: Antim. tart., Lobel.

Pulse in Heart and Other Diseases.

Kalmia: Slow small pulse (hypertrophy). Slow and feeble (angina pectoris). Quickened but weak pulse (rheumatism of the heart). Pulse slightly accelerated and many times slow (acute rheumatism).
Opium: Full and slow, with snoring; imperceptible, face purplish (cyanosis neonatorum).
Abrotanum: Pulse weak and small (chlorosis).
Aconite: Full, hard, strong (fevers and inflammation). Small, intermittent, irregular (in asthma). Quick and hard (peritonitis). Small and weak (during chill).
Ailanthus: Rapid and small; weak, sometimes scarcely perceptible, very frequent and irregular (scarlatina).
Apocynum: Pulse 45 between attacks of vomiting; (metrorrhagia).
Caladium: Pulse hard and bounding (in intermittents). Very frequent, hardly to be felt (typhus).
Eupatorium purp.: Pulse accelerated and full (ague).
Glonoinum: Low, feeble (sunstroke).
Helleborus: Frequent, soft, intermittent pulse (in hydrocephalus). Small, irregular (in hydrothorax).
Hydrastis: Pulse slow during the chill.
Kalmia: Slow, small pulse (with severe pain in the cardiac region). Slow, small pulse (hypertrophy). Remarkable slowness of the pulse, 48 in the minute (neuralgia).
Lachnanthes: Pulse 110, small, thin, hard (pneumonia).
Opium: Full and slow, with snoring.
Phytolacca: Heart's action weak (with constipation).
Sanguinaria: Irregularity of the heart's action and pulse (with coldness, insensibility).
Secale: Pulse thread-like in hæmorrhages.
Stramonium: Pulse slow in typhus.
Tabacum: Oppression about the heart; feeble pulse (cholera).
Veratrum alb.: Pulse intermittent, in feeble persons, with some hepatic obstruction.

Causative and Clinical Relationship.

Following rheumatism: Colchic.
Consecutive to chlorosis: Ferrum.
After abuse of mercury: Kali jod.
After repeated endocarditis: Kali jod.
When articular rheumatism has been treated externally: Kalmia.

Thickening of the valves after rheumatism: Kalmia.
Pericarditis, dropsy, diphtheritic patches in the throat, after scarlatina: Laches.
Dilatation, following endocarditis or fatty degeneration: Phosphor.
Psoric origin: Psorin.

From violent exertion: Rhus.
From violent running: Arnica.
From overexertion or suppressed discharges (in women): Asaf.
Consequent on fright: Stramon.
In children and young persons who grow too fast; after self-abuse: Phosph. ac.

PART VI.

MISCELLANEOUS PAPERS ON SUBJECTS RELATING TO DISORDERS OF THE HEART.

MISCELLANEOUS PAPERS.

THE INFLUENCE OF THE MIND OVER THE HEART.

The object of this paper is twofold :

First. To show the powerful influence which the mind can and does exert over the heart, and the manner in which such influence is exerted.

Secondly. The results which may be brought about upon the normal conditions of the heart by such influence; and their value from a medico-legal and therapeutic point of view.

We will first inquire how the mind can affect the heart; or, in other words, through what nerve-channels the intellect, the will, and the emotions can affect that important organ.

The heart is supplied with nerves by the pneumogastric and the sympathetic; but we find it impossible to make satisfactory experiments with the nerves in connection with the purely emotional influences.

We are obliged to depend mainly on negative testimony, viz., the effect produced upon the heart by irritation and by division of these nerves. Even here, unfortunately, we are met by so much contradictory evidence that it really seems hopeless to arrive at any definite conclusion.

Claude Bernard, Weber, Valentine, Schiff, and Lockhart Clark disagree in many essential particulars relating to the effects of division or irritation of the pneumogastrics.

The majority of evidence, however, is in favor of the conclusion that the pneumogastrics, pure and simple, contain motor fibres, and that, through the cardiac branches, they effect the motions of the heart.

The pneumogastric may contain sensory fibres also, and may, therefore, be a compound nerve from its origin.

With regard to the influence of the sympathetic, Carpenter

found that pressure on the great cardiac sympathetic nerve checks the heart's pulsations from four to six beats, causing fearful anxiety and pain; while Weber found that stimuli conveyed through this nerve accelerated the movements of the heart.

These and other facts leave no room to doubt that the sympathetic nerves are also concerned in the motions of the heart.

Now the question is whether the emotions act through them or the pneumogastrics, or both, when accelerating or retarding the movements of the heart.

As to the sympathetic nerves of the heart, Moleschott's experiments demonstrated that the same phenomena occurred as in the case of the vagi, when excited mildly or strongly by galvanism, and he concludes that these two sets of nerves exercise the same influence upon this viscus.

It appears fair, therefore, to conclude that the emotions act upon the heart both through the vagi and the sympathetic. Their *modus operandi*—now accelerating, now retarding its action—would seem to derive illustration from these and similar experiments.

If we were to substitute emotion for the stimulus applied by Moleschott to the nerves proceeding to the heart, we can well understand how the former should produce the various and opposite disturbances of this organ, including spasm and paralysis, with which we are familiar. First, as a feeble or moderate stimulus of the vagus (whether electric or otherwise) causes a considerable rise in the pulse, so does an emotion which is not excessive in character. Secondly, as an increased stimulus gradually retards the action of the heart, while a very powerful one immediately arrests it from the fatigue which succeeds stimulus, just so, we can well conceive, a violent emotion would act. Thirdly, the fatigue may be gradually recovered from and the heart's action restored to its normal frequency and force.

The ganglia of the heart appear to act in the way of communicating the condition of one of the four nerves supplying the heart to the other three. In regard to the emotional stimuli, however, it seems impossible to decide whether one is more influenced than another, and in view of Professor Moleschott's experiments, it is evident that the emotions may

act in precisely the same way through either the vagi or sympathetic.

We may be allowed to surmise that the ganglia and the fourfold supply of nerves to this organ are designed to lessen its liability to fatal spasm and paralysis by emotion.

"The heart," observes Moleschott, "is animated by four very excitable nerves, which may be easily over-excited; these four nerves, two vagi and two sympathetic, have a peculiar consensus, which is no doubt due to the action of the ganglia of the heart, so that the state of irritation or over-excitement of one is conveyed to the other three; but it is impossible to permanently exhaust the other three by the over-excitation of one nerve singly, as stimulants which would be powerful enough to effect this, would soon kill the excited portion of the one nerve, and therefore lose their effect upon the other three; such an effect being only possible as long as the nerve acted upon retains part at least of its excitability."

This conclusion accords with the opinion of Kirkes and Paget, that the cardiac branches of the pneumogastric are one, though not the sole channel through which the influence of emotion is transmitted to this organ, and with that of Dr. Carpenter, already cited; and it does not contradict the judgment expressed by him elsewhere, that the sympathetic constitutes the channel through which the passions produce palpitation of the heart, or Dr. Baly's statement, that the disturbed action of the heart during emotion is a remarkable instance of the influence of the passions over movements of organs supplied by the sympathetic.

Since Moleschott's experiments, those of MM. Cyon and Ludwig indicate the existence of accelerator and depressor nerves of the heart, the former emerging from the cord with the third branch of the inferior cervical ganglion, and the latter arising, in rabbits, from the pneumogastric and superior laryngeal nerves.

Bernard, it is stated, adopted this view, and held that the heart, with this sensory depressor nerve, is able to regulate its volume according to circum-tances, by exerting a reflex action on the general circulation.

If the inhibitory view of the pneumogastric nerve be established, we must, in attempting to explain the injurious mode

of action of certain emotional states upon the heart, suppose that the normal control which is being constantly exercised by this nerve is, under excessive emotion, so intensified under increased stimulation at its origin in the medulla oblongata, that the pulsations of the organ are partially or wholly arrested. A provision by which the heart is prevented sending more blood to an organ already too vascular from emotional excitement, may thus cause death.

It seems, however, that as long as physiologists differ so widely as to the functions of the nerves supplying the heart, it is impossible to determine the exact manner in which the emotions influence this organ.

The general conclusion is, that it is through the acknowledged sympathetic and probably through the pneumogastric by reflex action, when excited centrally by certain emotional states, just as it is alleged to do from the state of the heart at the periphery, or, if Moleschott's views be adopted, directly through the motor fibres of this nerve.

In order to be methodical and give a more clear and comprehensive understanding, we will take up the various functions of the mind, as the intellect, the will, and the emotions.

THE INTELLECT.

The influence of the intellect upon the heart is similar to that exercised over voluntary muscles.

The direction of thought to the heart has very generally an embarrassing influence on its regular action.

Sir Henry Holland says: "There is cause to believe the action of the heart is often quickened or otherwise disturbed by the mere centring the consciousness on it, without any emotion or anxiety." On occasions where its beats are audible, observation will give proof of this, or the physician can very often infer it while feeling the pulse; and where there is liability to irregular pulsation such action is seemingly brought on or increased by the effort of attention, even though no obvious emotion be present.

I have observed this phenomenon, in my own practice, in hysterical women, who imagine they have heart disease. In these cases a morbid attention to the action of the heart

would bring on palpitation and irregular action. Upon the removal of all anxiety by a decided assertion from me, after a careful physical examination, that the heart was not diseased, it would quickly resume its normal action.

From the same cause medical students, when their thoughts are directed by their studies to this organ, are frequently sufferers from its disturbed action. Anxiety, no doubt, comes in here to aggravate the disorder, and will be referred to again under emotions. Peter Frank himself, even in advanced life, while devoting especial attention to the subject of heart disease, during the preparation of his lectures, was attacked with severe palpitations, accompanied by an intermittent pulse, and felt certain that he was affected with an aneurism. The symptoms did not cease till some time after the completion of his labors, and after he had enjoyed the relaxation and diversion of a journey. In fact, it is quite a common remark that medical men often die from a disease that they have made a special study during life.

The question now naturally arises, is it possible for hysterical or hypochondriac persons to bring on permanent structural disease of the heart by a morbid concentration of the mind on it?

It is the opinion of most medical writers that it is not probable such a result would occur. They admit, however, that it would be likely to aggravate any previous mischief and induce irregular action, and ultimately hypertrophy, or some other disease decidedly organic. The physician should, therefore, in treating such patients, exercise his influence and ingenuity to divert their minds from the heart to some other subject or organ.

Numerous interesting cases are recorded showing the specific effects of the intellect over the heart's action, as one of a medical student being initiated into the rites of a Masonic society; his eyes were bandaged, a ligature bound around his arm, and the usual preparations made for bleeding. A pretence of opening the vein was made, and a stream of water spurted in a bowl to represent the sound of the flowing blood expected. As a result the student soon became pale and fainted.

Then there is the well-known case of the man being bled by the prick of a pin and warm water running down his arm, who actually died as a result.

The daughter of Sir Charles Lee, at 2 o'clock on a certain morning, saw between the curtains of her bed a little old woman, who told her that at 12 o'clock the next day she would be with her in the next world. She immediately dressed herself very carefully, went into her private closet, and did not come out till 9 o'clock, when she went to her aunt, handed her a letter d rected to her father with the request it be sent to him immediately on her death, telling her aunt about the apparition. A physician and a surgeon were sent for, but could discover no disease, but on the urgent solicitation of the aunt bled her slightly. She then took a chair and played on her guitar and sang some favorite pieces, and a few minutes before 12 went to a large arm-chair, sat in it, and at 12 raised her hand toward her heart and was dead.

Another case of a young lady who received a similar warning, only it came a year before the appointed time. She became anæmic, lost flesh and strength; nothing could apparently be done to save life, although no organic or structural disease could be found by the closest examination by skilful physicians. The day before the time set for her death a young physician who had some tact gave her a very heavy anodyne, and she slept under its influence during the entire day of her expected death. When she returned to consciousness the next day, and was making a few final preparations, she was assured that the time had passed for her to die and that the oracle knew nothing of such matters and was an impostor. She got up from her bed and rapidly regained both flesh and strength.

To be sure these are isolated and exceptional cases, and may by many be accounted for on influences other than intellectual, but in them we cannot help seeing a result comparing with the natural reasoning and with ideas firmly fixed in the minds of the individuals.

THE WILL.

Dr. Tuke says: "The direct action of the will upon the heart and nonstriated muscles, if it can ever be exerted, is altogether exceptional, although it may *powerfully influence them indirectly* by directing the course of the emotions and

ideas to them, and in this way it may, and probably does, affect the organic functions."

A distinguished Fellow of the Royal Society (æt. 79) told him that he could by voluntary effort, increase the frequency of his pulse from ten to twenty beats per minute. At the Doctor's request the experiment was made. When he sat down his pulse was sixty-two; in the course of about two minutes it increased to eighty-two. On being requested to describe the manner of accelerating it, he said it seemed to be partly due to "a sort of impulse," partly to an internal shiver, and partly to an action on the breathing.

The increase in respiration was not apparent.

It may be that the will did not act directly on the muscular tissue of the heart, but indirectly by concentrating the attention on that particular object, on that particular organ.

The case of Colonel Townsend, in which it is said he possessed the remarkable faculty of throwing himself into a trance at pleasure. The heart ceased apparently to throb at his bidding, respiration seemed at an end, his whole frame assumed the icy rigidity of death, while his face became colorless and shrunk, and his eyes fixed, glazed, and ghastly. He would remain in this state for hours, entirely unconscious, when the signs of life would gradually reappear.

Dr. Darwin says: "There is an instance in the Philosophical Transactions, of a man who could for a time stop the motion of his heart when he pleased."

THE EMOTIONS.

The heart may be so affected by the emotions, through the nerves supplying it, as to produce violent contractions—tonic spasms of the organ. This occurring in such a vital organ must of necessity cause death.

It is difficult to decide whether this results from muscular irritability, is caused by the withdrawing of an antagonistic nerve-force, or from the direct action of nerve-force upon the muscles; but it is evident that, in cases of death like Hunter's, a condition of spasmodic contraction of the walls of the heart is produced. Let me refer to the record of his death and post-mortem.

The governors of St. George's Hospital decided that no person should be admitted as a student without bringing certificates of being educated in the profession.

Hunter advocated, at the board, the admission of two young men inadmissible under the new rule. His biographer, Mr. Palmer, states that, before the meeting, he expressed his apprehensions to a friend, "lest some unpleasant dispute might occur, and his conviction that, if it did, it would certainly prove fatal to him." Arrived at the hospital he found the board already assembled, and entering the room, presented the memorial of the young men, and proceeded to urge the propriety of their being admitted. In the course of his remarks he made some observations which one of his colleagues thought it necessary instantly and flatly to contradict. Hunter immediately ceased speaking, retired from the table, and struggling to suppress the tumult of his passion, hurried into the adjoining room, which he had scarcely reached when, with a deep groan, he fell lifeless into the arms of Dr. Robertson, one of the physicians of the hospital, who chanced to be present. Various attempts were made for upward of an hour to restore animation, under the hope that the attack might prove to be a fainting fit, such as he had before experienced, but in vain; life had fled and all their efforts proved useless. The post-mortem showed the heart to be badly diseased; it was small, appeared to have wasted, and was strongly contracted. The viscera of the abdomen and head were loaded with blood.

As in such cases death seems to be caused by the severe and persistent spasm or contraction of the heart, it seems to me that the opposite condition of dilatation may also occur from emotional excitement. The organ would, in that case, cease to contract on its contents and become powerless, and death ensue. We see this in voluntary muscles and from emotional causes, as in the hand. In one case it will be rigidly contracted, in another paralyzed, the only difference in result being that the heart is a vital organ, the hand is not.

Senac gives a case of a person who was witness to a shipwreck, and became so affected by the distress around him and terror that palpitation of the heart was succeeded by sup-

pressed breathing, syncope and death. Upon examination the heart was found enlarged.

Bonnet, Morgagni, Tissot and others assert that dilatation of the heart has been caused by chagrin and anger.

Dr. Richardson says: "I have never met with a case of intermittent pulse in which the disorder was not sequential to some anxiety, shock, fear, sorrow, or their similars."

From statistics we learn that in the last twenty years deaths from heart disease have increased about twenty-five per cent., and the percentage of the increase is entirely confined to men, and to those between the ages of 21 and 45, which is the time they are subject to the most trying emotional causes.

It is not an uncommon occurrence to meet with syncope produced by emotional excitement, and in the case of a perfectly healthy heart we can readily understand why nothing more serious should supervene, and I think it equally clear that it should succumb when it is already diseased, and of course has less power of resistance.

Here again we find that exactly similar results are produced by the opposite emotions of joy and fear.

Lord Eglinton informed John Hunter "that when two soldiers were condemned to be shot, and one of them to receive a pardon, the event being decided by their throwing dice, the one who proved successful—thus securing a reprieve—usually fainted, while the other remained calm."

The American poetess, Lucretia Davidson, who died at 17, often fainted when listening to some of her favorite melodies from Moore, yet notwithstanding this, she would beg to have them repeated.

We often see examples where fear prevents fainting so long as it operates, and immediately it is withdrawn the system yields to the reaction and fainting takes place. A lady sitting up after the rest of the household had gone to bed saw a servant enter the door with a pistol in his hand. She immediately blew out the candle, pushed the bed from the wall, got behind it, and succeeded in evading him and getting out of the door and locking it behind her. She awoke the house and then fainted away.

The case of the doorkeeper of Congress, an aged man, who died suddenly on hearing the news of the capture of Lord

Cornwallis's army, is an instance of death from joy, and there can be no doubt that it was the result of cardiac and not cerebral lesion

Sweetser reports a case of an Irishman, aged 36, of ungovernable passion. Having experienced various misfortunes during the Revolutionary war, at length on the affairs of France assuming a more favorable aspect, received a pension, but which was immediately taken away from him on the death of the patron by whom it had been procured. Immediately on hearing the news he felt a dreadful heavy weight in his chest. His respiration became fatiguing, and the action of the heart assumed an irregularity which had no interruption during the two and a half years that he survived his misfortune.

On post-mortem the heart was found pale and flaccid; the parietes of the cavities fell together. There was an astonishing contrast between the flesh of the heart and that of the rest of the body, showing conclusively that it was the diseased organ.

It has been observed by African travellers, among whom are Livingston and Samuel Baker, that when the natives belonging to some of the interior tribes were taken from their homes by force or bribes, that their sufferings from homesickness were intense, and sometimes fatal. Their sufferings were not only mental but physical, for when asked to point out the seat of their evident suffering, they indicated correctly the region of the heart. These same authorities further assert that those who died showed all the evidences of death from cardiac disease.

It is well known that the Swiss soldiers some imes die of homesickness, attended with all the symptoms of cardiac failure.

Dr. M. Ward reports a case of death, which is so remarkable I cannot resist the temptation to quote it in brief. Dr. Ward was called on February 17th, 1870, to a Miss H. He found she had been suffering for several days from fever; had been out the day before. She had recently returned from the funeral of a sister who died from typhoid fever. Her symptoms became rapidly worse, and she died before morning.

A Mr. Filby, a butcher, who lived next door to the above Miss H., who had come for the Doctor shortly before her

death, appeared perfectly healthy but very much depressed. He told the Doctor he had never seen any one dead before, and hoped he never should again. He did not go to bed that night, but remained sitting in a chair, and apparently slept well. The next morning he was found slipping down in the chair, and, upon trying to arouse and get him up further in the chair, it was found that he was dead.

A post-mortem revealed a perfectly healthy man; no mark of disease could be found on any part of the body. Dr. Ward gave it as his opinion that it was a sort of gradual cardiac syncope.

A distinguished veterinary surgeon, of cool, well-balanced nerves, consented to having an operation of lithotomy performed. He had had a great aversion and dread of this operation. When the preparations were being made and the usual preliminary examinations, he showed no signs of fear, but when the catheter was being introduced he was observed to become pale and faint, and notwithstanding every effort was made to restore the patient, he died in about ten minutes.

Dr. Currie, of Edinburgh, engaged to perform paracentesis abdominalis in a case of ascites. On entering the room the lady fainted, and on attempting to restore her he found she was dying.

A station master on one of the Italian railways, 55 years of age, in robust health, was awakened one morning with the news that his station had been robbed. Although perfectly healthy the night before, he immediately became sick and died within twenty four hours. There was utter prostration, spasmodic action of the stomach, with obstinate vomiting, hollow voice, and failing pulse; consciousness continued to the last.

The case coming before the courts, it was decided, "that sudden mental emotion may induce death within a brief space of time, or even immediately, and even in persons of robust health, is a fact freely admitted in science." And that the fact of his not dying for twenty-four hours was no proof that it was not caused solely by the mental emotion.

is no myth. Dr. Murray says such is the influence of emotions on the heart that a sudden shock has been known to arrest its action or to excite it to an action so turbulent as to injure its valves or their tendinous cords. Those who have read my Lectures on the Heart will remember the cases there reported of actual rupture of the heart and sudden death in cases of persons dying from some great and sudden calamity.

A singular book has been published in England treating of the diagnosis of the crucifixion of Christ, by the eminent London surgeons, William Stroud and Sir J. Y. Simpson. In this they claim that Christ died from a literally broken heart.

Walshe states that a case is on record and well authenticated in which a former rupture firmly filled by a fibrinous coagulum, adherent to the walls of the heart, was found.

It is probable, says Brown-Sequard, that in cases of death from sudden emotion an excitation is produced on the roots of the par vagum, which appear to have their true origin in the neighborhood of the calamus scriptorius, and in consequence the bloodvessels of the heart contract and expel the blood they contained, and with it the natural excitant which causes the movements of the heart.

Dr. Carpenter takes the ground that the nerve-force is to be regarded as a polar force, analogous in its mode of transmission to electricity, and that death results from the reversal of the usual direction of this current.

Dr. Richardson says, in regard to cardiac paralysis, the balance between the heart and lungs is broken on the circulation side, and gives several cases to illustrate his idea.

I have brought forward but a small portion of the facts recorded in medical literature, illustrating the influence of the mind over the heart. But enough has been offered, I think, to convince the most skeptical of the actual existence of such influence.

It only remains to us to inquire into the practical value of such established facts. I believe them to be of the greatest importance to the physician, both in the study of the etiology of disease and in therapeutics.

Many cases of cardiac disorder are treated by remedies

which only have an action on the blood and nutrition processes, when, if the mental origin was known, no medicine would be prescribed, and the treatment directed to the ministering to a mind diseased. The homœopathic Materia Medica is rich in remedies which have a profound curative action upon a disordered mind. Such remedies, used alone or in conjunction with change of scene, diversion, or properly directed mental influences, will, in a majority of instances, remove cardiac disturbances of an apparently serious nature. But this portion of the subject must be deferred for consideration in another paper.

THE PATHOLOGY AND TREATMENT OF DISEASES OF THE HEART, CAUSED BY EMOTIONAL INFLUENCES.

It will be remembered that I have read before this Society several papers relating to the effects of the will and the emotions on the heart. Without going over the same ground again, I will briefly allude to the *manner* in which the emotions do affect the heart.

HOW EMOTIONS AFFECT THE HEART.

The experiments of modern physiologists, Claude Bernard in particular, show that all sensations act primarily on the nerve-centres, through the nerves reaching from the periphery of the body to those centres. The excitation thus determined in the brain, or spinal cord, is then transferred to the nerve filaments which extend to the viscera and members, and hence the latter are affected only secondarily

Of all the organs, the heart is the one which earliest and most profoundly experiences the influence of the sensitive excitations produced in the nerve-centres. So soon as any modification is produced in the central nerve substance, the nerves transmit this vibration to the heart, and at once the movements of the latter suffer a perturbation which is expressed in various ways.

If the ordinary bodily sensations experienced from physical influences thus affect the heart, through the brain and cord, how much more intensely do those mental sensations, caused

by purely emotional influences affect that organ, for the emotions affect the brain in a much more direct and immediate manner than the physical sensations. Emotional influences do not always affect the heart in the same manner. In fact, their influence on the heart is as varied and diverse as their influence on the mind.

We say the mind is depressed by grief and excited by joy. In the same manner emotions of sadness or grief so depress the heart's action that it beats with great feebleness, or its motion is almost arrested, causing that condition known as fainting. Joyous emotions, on the other hand, so excite the heart that the frequency of its beats is often doubled.

The heart, says Fernand Papillon, is no more the seat of the sentiments than the hand is the seat of the will; but it is a reactive, which is modified by the sentiments, with the utmost nicety and with infallible certainty.

Not only does the heart betray by the very disturbance of its normal rhythm the nature of the initial brain excitation, but it also produces throughout the whole organism disordered actions, the sum of which constitutes, as it were, the physical image, the palpable externals of passion. But it produces this disordered action only by reacting on the brain, which is the organ of all the demonstrations and of all the movements in the nerves, and consequently, of the muscles.

It is disbelieved by some, even at this day, that emotional influences can cause long-lasting functional disorder of the heart. Much less is it thought that they may cause structural changes in that organ.

In this connection,

THE STATISTICS OF INSANITY

are suggestive, if nothing else. Dr. Wilkie Burman, who has lately investigated the relations of heart disease with insanity, says: "Examination of the heart in the living and the dead shows that diseases of the heart are very frequent in persons suffering from mental diseases. In 500 cadavers, 36 per cent. gave a diseased state of the valves and apertures of the heart and aorta; 14 per cent. showed hypertrophy, without valvular disease; 30 per cent. showed hypertropyh, fatty degenera-

tion, and other heart diseases of minor importance; only 20 per cent. gave perfectly sound hearts. Of 630 male patients, 44 per cent. had heart disease. The average weight of the heart is, in both sexes, when suffering from mental diseases, heavier by one ounce than in persons of sound mind. This increase may be ascribed to the valvular morbid states, or to the hypertrophy which is seen in chronic and recurring mania, and in consecutive dementia, often without valvular disease, and most frequently attacking only the right ventricle."

Heart diseases are most frequently observed in patients with hypochondriac melancholy; with the so-called "melancholy with suspicion," causing a suspicious morose disposition, and it appears that the heart disease has some relation to it, whereby the subjective sensations offer a prolific foundation for illusions and delusions. In chronic cases and for advanced mental disease it shows an essential asthenic type, also feebleness in the circulation, cold livid extremities, and a weak, small pulse.

THE CONCLUSIONS.

If these statistics show anything, they show (1) that the presence of heart disease during mental disorder is too common to be an accidental coincidence; (2 that, in a proportion of the cases, the heart disease must have been caused by the mental; (3) that the coincidence of heart disease with melancholy is pretty conclusive that mental depression causes cardiac depression,—a condition which leads to certain forms of structural changes in the heart. I admit, be it remembered, that diseases of the heart may and do cause many cases of insanity. But I must affirm my belief that emotional shocks, or mental influences, may and do cause not only functional but organic heart diseases.

Take, for example, the influence of

FRIGHT, SUDDEN GRIEF,

or other sad and painful emotions. They suddenly diminish the rapidity of the heart's beating, and thus increase the amount of blood discharged from that organ at each diastole; hence the contractions by which it drives the blood into the vessels are very laborious and protracted. In some cases the

shock (as from fright, terror, or the sight of blood), may at once stop the motion of the heart, and as the blood is no longer discharged into the vessels, fainting occurs. This fainting may not only simulate death, but may actually cause it, by rupture of the heart or tetanic and persistent contraction of its cavities. But, if recovery occurs, the heart has received such a strain that it may take that organ weeks and months to recover, or it may not recover at all, but end in structural disease, for it is admitted now by all the best authorities that many functional cardiac disorders may, if persistent for a long time, end in organic disease.

Among the diseases of the heart which may be caused by mental emotions and psychical disorders may be enumerated: 1. Cardiac irritability, angina pectoris, cardiac myalgia, palpitation, and weakened heart; among the purely functional. 2. Hypertrophy with dilatation, and with enlargement, certain valvular diseases, rupture and aneurism; among the organic.

HOW EMOTIONS ACT.

Right here it may be of interest to inquire, Through what media do emotions act upon the heart? The recent discoveries of M. Cyon afford us a basis for the most probable explanation of the phenomena. The following embodies the results of his researches.

The heart is provided with a number of little, self acting nerve-ganglia without relations to the brain, from which spring, under the influence of the blood, a certain number of motor impulsions. These ganglia govern the usual normal action of the cardiac apparatus; but the rhythm and force of the beatings are every instant modified by excitations having their origin in the brain. The brain sends out to the ganglia of the heart two sets of nerves: the retardator (pneumogastric) and accelerator nerves. Excitation of the former diminishes the frequency and augments the force of the heart's movements. Excitation of the latter produces the opposite results, increasing the number and lessening the force of the heart's contractions.

Now it is evident that the emotions, according to their

quality and intensity, must affect these two sets of nerves either separately or together. Our next inquiry will be, then,

CAN WE CLASSIFY THE EMOTIONS

and arrange them in such a way as to show those which affect these sets of nerves in a special manner, either to excite or depress.

After considerable study of the action of the various emotions, and guided by such authorities as Tuke, Winslow, Carpenter, and Maudsley, I have ventured to arrange them as follows: (1) Emotions which excite mainly the retardator nerves: Joy, rapture, ecstasy, hope (with faith), pride, courage, love, adoration, wonder, and astonishment, to which we may add anger, rage, and wrath. (2) Emotions which excite mainly the accelerator nerves: Grief, sadness, discontent, disappointment, melancholy, despair, remorse, fear, fright, horror, anxiety, and wonder.

It may be said, in criticism of this arrangement, that we rarely find one emotion acting exclusively at one time. This is admitted, and it is the one chief element of uncertainty that prevents a perfectly satisfactory classification of the emotions. Suppose, for example, that we have joy and anxiety acting at the same time upon the brain. The result would be an excitation of both sets of nerves, causing an increased force with accelerated action of the heart. Again, astonishment from pleasurable causes would act altogether on the retardator nerves; but, if from unpleasant causes, on the accelerators

Apparently, the most opposite emotions cause similar head-symptoms, but when we analyze the nature of the effects, they will be seen to be widely different. Thus joy and terror both cause palpitation, but the former causes increased cardiac action with augmented vital force,—the latter produces an irritative frequency with deficient power. It may be asked, How can

JOY AND FRIGHT

both cause death? The action of an emotion is like the action of a drug. In small and repeated doses, quinine causes a continuous augmented action of the heart, not injurious un

less too long continued; while a massive dose acts suddenly, causing cardiac spasm and fatal symptoms. So joy, moderate and continuous, increases the vital manifestations of physical and mental life, but sudden and great joy kills by causing persistent cardiac spasm. Fright or terror may also kill suddenly, either by causing immediate cardiac failure, if the emotion is overwhelming, or destroy life more slowly by producing an irritative frequency which will end in gradual cessation of the contractions of that organ.

Enough has been said to show that we must study the effects of the emotions as closely and in the same manner as we study the effects of drugs on the human organism. We ought, some time, to have carefully arranged pathogeneses of the emotions, not only that we may recognize the peculiar diseases which they cause, but that we may use their influence as remedial agents for the removal of similar disorders.

THE TREATMENT.

We come now to the treatment of those disorders of the heart caused by the emotions. What is the first principle which should guide us in selecting the medicine, after we have prescribed the proper hygienic rules? The tenets of our school of practice give us the following laws, namely:

(1) The medicine chosen must be one which is capable of causing in the healthy a condition and symptoms similar to each special case

(2) The origin and direction of the medicinal force must be similar to the origin and direction of the original morbific force. This latter rule I consider of the utmost importance. Allow me to explain: In a case of irritable heart, when you have traced the cause to be excessive, unexpected joy, the emotion first affected the brain through the soul. This shock was transmitted by the pneumogastric nerve to the heart, which it caused to palpitate violently, with increased force, as well as increased frequency. An irritation of the cardiac ganglia was set up, rendering that organ more susceptible to any and all emotions. This irritability may become permanent and possibly end in structural disease, unless it is arrested. In selecting the medicinal remedy we must select

one whose pathogenetic action begins in the brain, and in that portion of the encephalon which presides over the transmission of joyous and all other exhilarating emotions. The medicinal or drug force, starting from that locality, when transmitted to the heart, must be capable of causing the peculiar kind of irritability which we find in the patient we are treating. Hahnemann and all his most scientific followers have recognized this rule, and when strictly followed it has resulted in some brilliant cures. Those who restrict themselves to covering the totality of existing symptoms will find the cure of their patients tedious and unsatisfactory.

Another rule I would add, of equal importance with the above, namely: When the primary symptoms of the case resemble the primary symptoms of the medicine selected, prescribe that medicine in the high attenuations. When the secondary symptoms of both the medicine and the disorder are coincidently present, the dose should consist of appreciable, or material, quantities.

THE MEDICINES.

We will now enumerate the medicines which will be found useful in cardiac affections from emotional causes, but in order to have a clear understanding of their action we shall compare the pathology of the emotions with the pathology of the medicines, namely:

The emotions of joy, rapture, ecstasy, hope, pride, courage, anger, rage, wrath, love, adoration, wonder, and astonishment, all stimulate and irritate the retardator nerve and increase the force of the heart's action. Excessive and sudden joy, anger, and rage over-stimulate the retardator nerve and cause sudden death by cardiac spasms. Of medicines, Ammonia, Agaricus, Cinchona, Coffea, Crocus, Cactus, Camphor, Belladonna, Digitalis, Hydrocyanic acid, Lycopus, Laurocerasus, Ignatia, Nux vomica, and Cannabis indica, all stimulate the pneumogastric or retardator nerve and augment the force of the heart's contractions. Of these, Cinchona (and Quinine), Camphor, Belladonna, Digitalis, Hydrocyanic acid, Nux vomica, and Ignatia, if taken in massive doses, are capable

of over-stimulating these nerves to such a degree as to cause sudden death by cardiac spasm.

It follows, then, that among these medicines you will find the remedies for the cardiac disorders consequent on the morbific effect of those emotions which irritate and over-stimulate the retardator nerve. In our old repertories you will find many of these mentioned as having been recommended by Hahnemann and others.

AN ILLUSTRATIVE CASE.

As an illustration of the proper method of treating a case of prolonged cardiac hyperæsthesia from the combined effects of excessive joy and anxiety, I will narrate one that came under my care a few months ago.

A young married woman applied to me for the relief of an unpleasant nervous feeling in the chest, not amounting to pain, but an "uncertain, weak, weary sensation," as she expressed it. She was subject to alternate feelings of depression and exhilaration; a strange sensation of sinking, and emptiness in the pit of the stomach; the heart's impulse was feeble, its rhythm not disturbed, but the pulse-beats were small, soft, and averaged 100 to 110 per minute, even when lying down. Here were symptoms which appeared to call for Collinsonia, Lycopus, Prunus, and some others, but the history of the case revealed the true similimum. She had always been strong and healthy, but, during the civil war, her affianced was in the army during its most perilous campaigns. On several occasions rumors of his death reached her; on one occasion she did not hear from him for several months. Meanwhile it was supposed he was starving in the prison-pen of Andersonville. All this time her heart was being irritated and weakened by the emotions of anxiety, grief, and despondency. How true the ancient adage, "Hope deferred maketh the heart sick." At last, when she had nearly given him up for dead, he suddenly appeared before her; but wan, and thin, and pale—a mere shadow of his former self. The shock was sudden and overwhelming, not of joy alone, but mixed with astonishment, pain, and sorrow.

As we rarely find among the sick an affection of one organ

and tissue alone, so do we rarely find cases where one emotion, unmixed with others, exercises its specific, uncomplicated influence. In this case, however, joy was the one predominant emotion. Her heart, already weakened and irritated by grief and anxiety, succumbed to the excessive stimulation of joy, and cerebral congestion, throbbing temples, loud hysterical laughter, followed by spasmodic weeping, and a sensation "as if the heart was trying to beat painfully in a cage," as she expressed it, ended in a nervous erethism which had never left her, although she was happily married and situated pleasantly in life.

The remedy in this case proved to be Ignatia. It covers all the symptoms and conditions, and also simulates the history of the disorder. One dose of a high potency was given and allowed to act a week. This was followed by doses of the lower attenuations, three times a day, and she was cured in a month.

IN ANOTHER INSTANCE,

occurring in a healthy woman, where no previous anxiety had weakened the heart, the unexpected news of great good fortune caused a condition of extreme nervousness, with strong, quick palpitation of the heart, sleeplessness, and cerebral erethism. Here the remedy was Coffea; a few doses of a lower attenuation promptly arrested the cardiac excitation after it had continued a week, notwithstanding the use of morphine and other anodynes.

The emotions of grief, sorrow, anxiety, expectation, discontent, melancholy, despair, remorse, fear, fright, horror, and astonishment, all stimulate chiefly the accelerator nerve and quicken the heart's action, while they decrease the force of its contractions. Of these, grief, fright, terror, expectation, anxiety, and fear have caused death, from cardiac paralysis. The heart in such cases is found relaxed, flaccid, and its cavities uncontracted. Of medicines, Aconite, Arsenic, Calabar, Chloral, Cimicifuga, Crotalus, Gelseminum, Iberis, Lachesis, Phosphoric acid, Platina, Veratrum album, and Veratrum viride irritate the accelerator nerve, and weaken the heart. Of these, Aconite, Calabar, Chloral, Lachesis, and Crotalus, are capable of causing sudden death from cardiac paralysis.

It would not be proper in a paper of this scope to give the special indications for each remedy. Such indications are to be found in our text-books on materia medica. I will, however, give

TWO TYPICAL CASES

as illustrative of the effect of medicines in the treatment of cardiac weakness.

A weakly young man, at the time of the great fire, awoke suddenly to find his room in flames, and no apparent means of escape. He was seized with an overwhelming terror, which caused profound syncope, and he was taken from the floor of his room apparently more dead than alive. It was many hours before he rallied from the shock, and then his mind and body both appeared hopelessly enfeebled. When I first saw him, it was several weeks after that fearful night, but his face still wore a look of settled fright, mingled with terror. His skin was cold and clammy. Any reference to the fire caused a cold sweat to break out on his forehead and hands. His pulse was small, weak, and quick, the heart's action feeble, quick, and incomplete. His appetite was quite good, and there was no particular abnormal condition of the digestive system. Here was a case that called for Aconite, and a few small doses restored him to health in a very short time.

A young and blooming farmer's daughter met with a severe disappointment in her affections. Her lover left for parts unknown. Weeks and months passed and no tidings. She did not weep, or make any outward demonstrations of grief, but her color faded, her plumpness disappeared, the extremities became cold, a dry, hacking cough set in, her breathing became shallow, dyspnœa occurred on the slightest exercise, and her mind became obtuse. She seemed all the time brooding over her sorrow, but no sighs or tears escaped her. She ate when food was set before her, but expressed no desire for anything but to be allowed to be alone. The heart beat feebly and quick, and the pulse was almost imperceptible.

You will all recognize this as a case calling for Phosphoric acid, whose deepseated and profound depressing effect on the nervous life of the heart made it the specific remedy in this

case. A few drops of the third attenuation in water, three times a day, removed all the physical symptoms in a few weeks, and even the mental condition became more hopeful. After the medicine had nearly restored her, her recreant lover returned and finished the cure.

I ought to mention another class of remedial agents whose action appears to be soothing and calming to both sets of nerves above-mentioned. They are Ambra, Castoreum, Asa-fœtida, Cocoa, Scutellaria, Guarana, Cypripedium, Valerian, and Zinc.

STRENGTH OF THE HEART.

Before we pass to the hygienic treatment of the disorders herein mentioned, we may as well try and answer the pertinent question, Why is it that the heart is affected abnormally by the emotions? The heart, in its normal state, should have the same relative strength possessed by the general muscular system. It is the systematic use, and not the irritation, of a muscle, that gives it strength and endurance. That great muscle constituting the heart can, under proper use, become one of the strongest in the human body. But it requires, to make it strong, plenty of fresh air, free from carbonic acid; regular, active exercise; at least eight hours of good sleep, and the avoidance of alcoholic stimulants, impure tea and coffee, tobacco, narcotics, an abuse of the passions, all the depressing emotions, and even an excess of those which are exhilarating. How many American men and women in this year of Our Lord live up to these requirements?

Generally the foundation for cardiac debility is laid early. Beginning in infancy the young child is improperly dressed and improperly fed. It is allowed unnatural condiments and food before it should be weaned from milk and bread. It is placed in schools, and its tender brain crammed with the rubbish of dead languages, when it ought to be in the fields or gardens gathering flowers; or romping in untrammelled freedom. Of all persons

THE WOMEN OF THIS COUNTRY

grow up with the weakest muscular structure, and consequently the weakest hearts. Place your finger on the pulse of the aver-

age schoolgirl attending a fashionable seminary or academy, or the ordinary woman of fashion, you will find her pulse small, soft (or wiry) and very unequal. Her heart beats in the same manner, unless she is under the influence of some abnormal excitement. Her extremities are cold and blue, and a general languor pervades the whole body. What has brought all this about? From childhood she has lived in hot, close rooms, in an atmosphere containing a large percentage of carbonic acid. She eats but little meat, milk or bread, but largely of cake, preserves, confectionery, and other improper nicknacks. She reads trashy novels, every page of which calls up emotions and passions which excite her mind and brain. The heart becomes weak and irritable, and in time it acts unfavorably upon the brain, rendering it excitable and susceptible to the very emotions most injurious to its integrity and vitality.

Compare this picture with that of the robust and healthy schoolgirl in the country or village, or a woman in any position in life, whose physical training has had in it some element of common-sense. Or, we will say, some servant-girl of Irish, Scotch, or English descent, or an American farmer's daughter who is not too proud to work. How firmly the pulse of such a person beats under the finger! It seems to lift and throb with a strong vitality, and its rhythm is like the steady step of a trained soldier. We know that the heart which thus sends the blood into the arteries is strong, enduring, and full of vitality.

The above pictures are applicable to men and women of all ages and conditions in life. The former class are susceptible to the malign influence of emotions which would not affect the latter abnormally. The healthy heart, strong and steady, is not affected unpleasantly, or provoked to disordered or painful action any more than the trained pedestrian is affected unpleasantly by a walk of a few squares.

In conclusion, allow me to assert that we ought to teach that the heart, as well as the brain, or the muscular system in general, requires regular systematic exercise and training, in order that it may have ordinary immunity from abnormal emotional influences.

ON THE RELATION OF SUDDEN DEATH TO CARDIAC DISEASES.

Popular fallacies are not confined to the public. Certain fallacious ideas concerning special subjects become popular with and gain advantage in the various professions.

For example, there are certain popular medical fallacies which cling to the medical profession as well as to the people; and although the best authorities on medical topics announce repeatedly the erroneousness of such belief, they retain their hold on the popular and professional mind with a singular pertinacity. For this state of things a portion of the medical profession is to blame. Some physicians are prone to pander to popular and vulgar beliefs, however groundless they may be. We all know how dangerous it is for the young physician, or one who has not gained for himself a position as an authority, to set up his opinion against that of the masses, or even the dictum of an ignorant but dogmatic nurse. For these, and many other reasons, certain opinions relating to sudden death, not supported by absolute proof, are very prevalent, much to the detriment of true science.

It is my purpose in this paper to allude to but one of these popular fallacies, and solely for the purpose of disabusing the popular mind of its supposed truth. I refer to the prevalent idea that sudden death is generally caused by some form of disease of the heart.

It is the habit of the public, when a case of sudden death occurs, not directly traceable to some acute disease, and when the immediate cause is not perceptible to the senses, to ascribe such sudden dissolution to disease of the heart. In the popular mind but few other causes are sufficiently potent to produce rapid dissolution of life in a man in apparent health, or even during the progress of known chronic disease. With physicians, who should be peculiarly careful as to an opinion in such grave cases, the same habit of ascribing to cardiac disease all sudden deaths which they cannot immediately account for is altogether too prevalent.

In fact, heart disease is too often made the scapegoat upon which is loaded the results of ignorance and insufficient investigation. Let a man fall dead in the crowded street, or at his own table, or be found dead in his bed, and the physician who is called in seems to have no hesitation, in the majority of cases, to ascribe the cause of this sudden death to heart disease. The alleged cause is then proclaimed in the papers, and as such it is reported to the Board of Health, and thus placed upon the records.

What grounds had the physician for giving such an opinion? Was he conversant with the history of the deceased? Did he make a post-mortem examination.

In the great majority of instances no adequate inquiry is made concerning the history of the patient, and in but very few cases is any post-mortem examination made. The opinion is given because it is the easiest made, is the most plausible, and one with which the family are best satisfied. I do not hesitate to say that such an opinion, unless based on positive knowledge, is a subterfuge of ignorance and indolence, and a disgrace and reproach to the medical profession.

And it is more than this. It is a positive injury to the health and happiness of the people, especially those who are connected with the victims of sudden death; and actually endangering the lives of those who suffer from cardiac diseases.

To the former class the dread of a similar unheralded and sudden death becomes a nameless horror which haunts them all through life, and nothing is more difficult for the physician than to treat that class of sufferers. A slight illness is sure to be accompanied by mental depression, attended by such a dread as to render their lives miserable in the extreme.

I propose, in order to establish the above assertions, to take up and consider briefly the principal diseases of the heart, and their liability to cause the accident of sudden death.

Beginning with the inflammatory diseases, let us inquire into the circumstances under which death occurs. Is it sudden? On the contrary, dissolution is usually attended by prolonged suffering, a gradual failure of the heart's vitality, and an unmistakable struggle. Only in rare instances, and those readily avoidable, does a sudden death carry off the patient.

In pericarditis, paralysis of the heart may sometimes occur

suddenly, and to a certain extent, unexpectedly, as when the patient, through carelessness of orders, or the inattention of attendants, makes some violent and sudden motion.

In endocarditis, the danger of sudden death is still less, indeed, it rarely occurs, unless the muscular structure is involved, when cardiac syncope, with sudden arrest of circulation, may occur from imprudent exertion or ineffectual treatment.

Next in order are the functional disorders of the heart, in which it does not seem possible, nor is it probable, that sudden death could occur through any fault of that organ. Even in angina pectoris, not due to organic disease, when the agony is fearful and the collapse great, sudden dissolution is the rarest of incidents.

Even granting that death may sometimes occur from the *shock*, as it is termed—for it is well known that in certain debilitated constitutions *pain* alone, by its intensity and severity, may destroy vitality very rapidly—how are we to know absolutely that the *pain in the heart* caused death? There are other thoracic pains which are fully equal in intensity to cardiac neuralgia. It has been supposed that there are such conditions of functional disorder of the heart as choreic convulsion, tetanic spasm, irregular contraction, and the like, which might cause rapid dissolution. But this is not fully proven. The heart is often found rigidly contracted after death, but this is generally *rigor mortis*, and not a true pathological state, occurring previous to death.

Right here I would like to demolish one of the most common of the popular fallacies relating to the heart, namely, *that it is a delicate organ whose vitality is easily destroyed.* On the contrary the heart is more tenacious of life than any organ in the body. It will go on with its work when all other organs have lost their integrity, or when its own integrity is impaired to a degree that seems wholly incompatible with its own vitality. It will even go on beating when taken out of the body, and after it has ceased to beat for hours, it may be irritated by electricity or galvanism, and commence beating again, from a strange latent vitality. The wonderful tenacity of life possessed by the heart is best seen in those

organic or structural diseases in which great and important changes have taken place in its walls or valves.

The walls of the heart may become so thick that the organ becomes monstrous in weight, or so thin that they are attenuated to the last degree. In the former (hypertrophy from enlargement), death rarely occurs suddenly from the immediate consequences of the enlargement. If the patient should be of apoplectic habit, the enlargement might aid in bringing about an attack, but the resulting death could not properly be said to be due to the cardiac disease.

In the latter (hypertrophy by dilatation) death does sometimes occur suddenly, not unexpectedly by any means, but from sudden paralysis or rupture of the attenuated muscles. But nothing more astonishes the physician who sees much of cardiac disease than the length of time patients live with attenuated hearts, and the exertions they will undergo, necessary and unnecessary, without suddenly destroying the motive power of this wonderful organ.

It would seem that so long as there exists sufficient muscular fibre to force the blood out of the ventricles, the heart will go on beating in spite of all our predictions to the contrary.

Valvular diseases of the heart are rarely the immediate cause of death, and still more rarely do they cause *sudden* death. Prof. Tully likens the heart to a force pump, and observes that "it may be a very poor heart, but a pretty good pump." In other words, it will keep up the circulation of the blood long after its machinery is greatly deranged. Death from valvular disease occurs from the arrest of function in other organs, namely, the kidneys, lungs, or brain, or from the deposit of *emboli* in important arterial trunks. In only one or two instances can sudden death result. An embolus may plug a cerebral artery, thus cutting off the supply of blood to the brain and cause sudden and fatal coma and paralysis, or it may obstruct one of the great arteries leading from the heart. What are sometimes called polypi of the heart are of this nature, large fibrinous masses, which sometimes completely fill one of the heart's cavities, causing sudden arrest of its contractions.

Prof. Meigs, in his treatise on obstetrics, mentions this liability to the formation of fibrinous clots within the heart,

especially during the puerperal state, when from loss of blood the circulation becomes so enfeebled that the blood accumulates and stagnates in the cavities. This author accounts in this way for the cases of sudden death after childbirth, and during syncope induced by assuming suddenly the erect posture after profuse hemorrhages.

One of the most common causes of sudden death is *rupture of the heart*, but this accident is of very rare occurrence. It usually occurs from softening, or fatty degeneration; from abscesses or ulcerative perforation, or from aneurism or attenuation of the walls of the heart. The immediate cause in such cases has been usually ascribed to great mental excitement, anger, grief, or to sudden physical exertion, but Dr. Hallowell has collected *thirty-four* cases of sudden death from rupture of the heart, and it is a singular fact that in the large proportion of cases the patients were in a state of repose when it took place.

Death generally follows the rupture almost instantaneously. It is rare that any struggle follows the breakage of the walls.

The common phrase, "died of a broken heart," is not a mere myth, as some have asserted, for rupture of the heart-walls, from sudden and overwhelming grief, has been known to occur.

In fatty degenerations, sudden death oftener occurs from cardiac paralysis than from rupture. The muscular fibres are so far replaced by fat that not enough are left to propel the blood out of and contract the cavities.

The fallacy of referring all cases of sudden death to disease of the heart is well shown, if we consult any standard work on pathology, where it will be found that it may be brought about by very many other conditions, namely, diseases of the brain of an apoplectic character; spinal and cerebro-spinal congestion and extravasation; the bursting of internal abscesses and aneurisms; internal hemorrhages, and even severe mental shocks. It may also be caused by the lightning-stroke, excessive heat (sun-stroke), various injuries of an unknown nature, the action of poisons like prussic acid, and the venom of serpents.

I will venture to assert that if we could get trustworthy statistics, the ratio of sudden deaths from heart disease, com-

pared with those arising from other causes, would not be greater than three to ten!

Now, to briefly recapitulate. The causes of sudden death from heart affections may be divided into *three* classes:

I. From paralysis of its muscular structure.

II From rupture of its walls.

III. From mechanical arrest of its movements by clots, polypi, etc.

The instances of sudden and fatal cerebral or pulmonary apoplexy from heart disease are so rare that we may waive their consideration. Sudden paralysis can only occur from excessive attenuation of its walls, in debility from excessive loss of blood, during convalescence from typhus or other enfeebling diseases, from softening or fatty degeneration, or during acute pericarditis.

TREATMENT.

It comes properly within the scope of this paper to suggest the treatment of those cases where the appearances indicate that sudden death will occur during the progress of cardiac disease. In cases of threatened paralysis, from whatever cause, the assistance must be prompt and energetic. First of all the patient must be placed in the recumbent position, upon a level bed or floor (the head not elevated), and on the right side, if on either. Then we must immediately give the most rapidly acting cardiac stimulant we possess. Alcoholic spirits will do, but I prefer the *volatile Ammonia* to all others. The aromatic spirits should be administered in suitable doses until the pulse and heart-beats show that the patient is out of danger. Next to Ammonia, and more efficacious as a true remedial agent, is Digitalis, in material doses. If possible I generally give both remedies in rapid alternation.

In such cases do not be afraid of Digitalis. It is not the depressing agent it was decreed to be by our predecessors, but a true cardiac tonic, capable of saving life when all other medicines are useless. Cases may occur, however, where Camphor, Veratrum album, Veratrine, Gelseminum or Arsenicum are the appropriate remedies.

In rupture of the heart there is no time to use medicinal

agents even if they could be of value, for the death is as sudden as it is inevitable. The same may be said of those mechanical impediments called polypi, heart-clots, and fibrinous concretions. The moment they form of sufficient size to block up the great arteries, or arrest the cardiac contractions, no human interference can save the victim.

In conclusion I feel called upon to declare that it is a duty which physicians owe to themselves, to the profession, and to the public that they decline to give an opinion as to the cause of sudden death, unless their previous knowledge of the pathological condition of the deceased, or an actual post-mortem examination of the body enables them to give a positive opinion as to the cause of death.

And it is also the duty of the constituted authorities, the members of the Board of Health, to refuse to receive reports ascribing sudden death to heart disease, or any other alleged cause, unless they are fully satisfied that the physician has investigated the condition of the patient, before or after death, in a competent and scientific manner. The neglect of such an evident duty, has often resulted in the covering up of gross ignorance or a terrible crime.

COLLINSONIA IN IRRITATION OF THE CARDIAC NERVES.

Those physicians who are familiar with the history of the introduction of the Collinsonia as a remedy in the homœopathic school, are aware that it was first mentioned in the first edition of *New Remedies*. In the second edition an additional proving, by Dr. Burt, was published, which proving verified many of the symptoms previously given. Mention was also made of a discussion before the Western Institute of Homœopathy, relative to its use in cardiac affections. Several physicians testified to its value in disordered action of the heart.

On page 258 of *New Remedies* will be found a report of the curative value of Collinsonia in a case of pulmonary hemorrhage. It is to be regretted that the condition of the heart and circulation was not mentioned, as it might have thrown some light on its action in such cases. Is it not probable that

it assisted the hemorrhage by virtue of its homœopathicity to irritation of the heart with too great action?

Since the publication of *New Remedies*, in 1867, much additional experience with Collinsonia in cardiac affections has been published, principally by the Eclectic school, and some valuable clinical observations by our own.

The most valuable contribution to the clinical history of Collinsonia has been from the pen of Dr. M. M. Fenner, of New York, and published in the Proceedings of the New York State Society (Eclectic). He states that he has found it most useful in that condition known as "irritation of the cardiac nerves."

"Every practitioner," he says, "is familiar with cases of excited actions of the heart, that he could not refer to any palpable cause. It is common in one's daily practice to meet with perturbations in the rhythm of this great centre of the circulation, but it is usually not difficult to find the offending cause."

The *causes* of this affection are derangements of the digestive organs; abuse of stimulating liquors and condiments; derangements of the portal circulation; excesses in venery; mental emotions; or any causes which impair the integrity of nerve tissue.

The Symptoms.—Idiopathic cases of this affection may occur, in which the abnormally and persistently increased action of the heart may be all that may be discovered.

But it is generally a sympathetic affection, arising from reflex irritation, transmitted from disorder of the stomach, lungs, uterus, and other organs.

The more common symptoms are *pressure in the præcordia*, a feeling of fulness in the chest or heart, or both. Dr. Fenner says it is always—so far as he has observed it—*periodical*, perhaps intermittingly so at first. The pulse beats rapidly, full, and strong, sometimes reaching as high as 140 beats in a minute, but more often about 120. Generally, more or less of oppression and pain exist in the chest, sometimes with a feeling of faintness.

Any unusual stir, or the appearance of strange faces, will usually increase the rapidity of the pulse, and aggravate all attendant symptoms in a marked manner. So much is this

the case that the patient will live in constant dread of hearing or seeing something new. This condition is quite common in women suffering from spinal irritation or uterine disorder.

After a full meal, the taking of stimulating drinks, or any other circumstance calculated to excite vital action, all the symptoms will become temporarily aggravated. *During sleep*, on the contrary, the patient becomes comparatively quiet, with respect of cardiac pulsations, until the latter stages of the disease, when even in this state of repose he shows the abnormal cardiac action. The irregularly periodic action becomes a sustained effort.

Thus the disease continues until the sufferer is worn out by the continued exalted action. He becomes emaciated and effeminate; distressingly sensitive to all external impressions. There seems to be no tendency to spontaneous subsidence of the symptoms, and recovery. The disease once established, from whatever cause, seems to be self-sustaining, and continues, although the cause may disappear, until relief is obtained by treatment, or death claims his victim from this alone, or the conjoined effects of this and some supervening disease.

This affection has yet hardly a place in the established nomenclature of diseases. Watson mentions it under the head of "irregular action of the heart." He says: "Besides these over-strong or irregular movements, which are symptoms of disorder of the stomach, *there are palpitations* of a purely nervous kind; I mean they depend upon a peculiar and highly sensitive condition of the nervous system."

In Scudder's Practice (Eclectic) there is a section devoted to "Excited Action of the Heart," and referred to as a symptom of: 1st. Derangement of the circulation; 2d. Derangements of contiguous viscera; and 3d. Irritation of the cardiac nerves. Dr. Handfield Jones, in his excellent work on "Nervous Disorders," gives, under the head of "Cardiac Neurosis," a full description of this affection, illustrated by numerous cases. He would call the disorder "Cardiac hyperæsthesia." He says: "A common form of cardiac neurosis is that when the action of the heart is much accelerated, varying from 110 to 140 in the minute in the standing position, and not falling much below the former figure in the sitting. The contrac-

tions are abnormally sharp and vivid; the organ seems to spring up with a quick, forcible leap against the ribs. The apparent excess of action misleads the practitioner sometimes to suppose that there is hypertrophy. Percussion, however, shows that no enlargement exists, and auscultation detects no vascular bruits, nor derangement of the rhythm. The feeble stroke of the radial pulse often contrasts markedly with the vivid action of the heart. The general condition of the patient exhibits, more or less, indications of debility." Dr. Jones considers the excessive use of tea to be the principal cause of this condition.

My own experience in this affection has satisfied me that it often has its origin in spinal irritation, either reflex or idiopathic. It may have a rheumatic origin, in which case it might be called a "rheumatic neurosis."

According to Bezold, the nervous centre of the cardiac movements furnishing three fourths of the entire propulsive force of the heart, occupies the cervical region of the cord, including the medulla oblongata, and extends as low as the fourth dorsal vertebra. Its fibres run through the cervical spinal cord, and pass out between the seventh cervical and fifth dorsal vertebra, probably passing through the lower cervical and upper dorsal sympathetic ganglia and proceeding to the heart. If we suppose a rheumatic disorder, assuming the form of intercostal neuralgia, it is not difficult to understand how, by extending backwards and involving the origins of the upper dorsal nerves, it might induce a rheumatic neurosis of the cardiac nerves, resulting in hyperæsthesia.

I have often found in cases of excited action of the heart á tenderness of one or more of the cervical or dorsal vertebræ, or a tender spot on one side or the other of the spine.

TREATMENT.

Before proceeding to the examination of the value of Collinsonia in this affection, we will make some inquiry into the treatment usually adopted.

Handfield Jones, who may be considered the best allopathic authority, says: "The treatment of cardiac hyperæsthesia is too often unsatisfactory, probably because it is impossible to obtain rest for the organ. An irritable brain or stomach may

be soothed by giving them timely repose, but we can do this but very partially with the heart. Belladonna plasters are generally useful. Internally, I have seen most benefit from tinctura digitalis, fifteen minims a day, but I am not altogether satisfied how far it is quite safe to give this drug in states of cardiac excitement. In conditions of cardiac languor I have no fear of it, but in the opposite I think we must be cautious."

[Digitalis is doubtless homœopathic to cardiac hyperæsthesia, but only when it depends on a secondary condition characterized by loss of tonicity. In this condition it may be given in the lower dilutions with success.]

Dr. Jones also suggests Opium, Nitrate of Silver, Aconite, and Hydrocyanic acid. In another place he says all nerve-tonics tend to decrease and strengthen the action of an excited and weak heart. This is doubtless the case owing to the fact that primarily all tonics increase and excite the action of the heart to an abnormal degree, while secondarily they cause an irritable and weak condition of that organ.

Various remedies have been recommended and used successfully for this condition. Iron, especially the iodide of iron, has been found useful. The bark of the wild cherry (*Prunus v.*) has a specific effect on the heart, especially when its action is rapid, weak, and irregular. Lycopus virginicus is useful in moderating excessive action, and will probably be found curative in cardiac diseases, with exophthalmia.

Dr. Fenner, above quoted, says the specific remedies for this condition are Cactus grandiflorus, in doses of 10 to 20 drops of the tincture three or four times a day (he acknowledges that he gets his information from homœopathic sources). Pulsatilla, Collinsonia, and Lobelia, in non-nauseating doses, are also claimed to possess specific powers over cardiac irritation.

The homœopathic treatment of irritation of the cardiac nerves has never been fully elucidated, nor the specific indications given for the use of our remedies. It is obvious that we must be guided by the pathological condition, as well as by the totality of symptoms, modified by those *characteristic* indications which are sometimes so useful in practice.

A careful study of the heart symptoms given in the *Rep-*

ertory to Jahr's Materia Medica, will afford a comparative analysis of the remedies we have at our command.

It is probable that all those medicines included in the Aconite group, viz., Gelseminum, Veratrum viride, Veratrum alb., and Cactus grand., are in many cases homœopathic to this malady. Digitalis, Hydrocyanic acid, Kalmia, Laurocerasus, Prunus, Thea, Tabacum, may each be found useful if we select them with a full knowledge of their pathological action.

My experience leads me to prefer Cactus, Digitalis, Lycopodium, and Collinsonia, as being most generally useful in this complaint.

DIGITALIS has succeeded best in my hands when the excessive excitement was an idiopathic affection consequent on nervous depression secondary to some excitement; or was the result of previous inflammatory action in the system which left the heart itself in a debilitated condition, or hypertrophy with thinning of the walls; or was caused by loss of fluids, or was present in convalescence from acute disease.

CACTUS is most useful in affections of the motor and sensory nerves; when the increased action alternates with spasms of the tissues of the heart, and congestions of the head and chest occur as complications or results.

COLLINSONIA, although it has been of great value to me in this disorder, has not been sufficiently subjected to physiological experiments on the healthy to enable us to explain its method of action. It is a little strange that Dr. Burt did not observe any cardiac symptoms; nor have those patients who have been treated by large doses observed any derangement of the heart. It may be that it should be proven in the higher potencies in order to bring out these cardiac symptoms which certainly appear to belong to it, if we can judge by its curative action.

Dr. Fenner says: "I have tried as yet only the Collinsonia, not having had occasion to go beyond this agent for the relief of this affection. In every instance in which I have used it improvement has followed its administration." He gives it in doses of 10 to 30 drops every three or four hours, if the case demands. I have not found it necessary to use more than 5

or 10 drops of the first decimal dilution. The symptoms cured by Dr. Fenner are these:

Periodical spells of faintness and oppression.

Pulse 140 per minute, steady and quick.

Attacks of syncope, with fulness of the chest and difficulty of breathing.

The slightest emotion or excitement of any kind would aggravate the symptoms.

Pulse very strong, 128 per minute, and intermittent.

Severe attacks of dyspnœa, with great weakness.

We shall not venture to theorize on the probable method of action of this remedy, but it will do no harm to place before the physician some facts relating to its effects on disease.

I. It relieves headaches consequent on suppressed hæmorrhoidal discharges—at least under its action the hemorrhoids return and the headache disappears.

II. In preliminary hemorrhages the Collinsonia arrests the bleeding, but brings back the hæmorrhoids which existed before the hemorrhage.

III. In cardiac disorders, such as palpitation, irregular action, and excessive action, this remedy relieves; but under its action hæmorrhoids appear, or a suppressed menstrual flow returns.

These three facts seem to show that the reflex action on the nerves controlling the circulation are in some way controlled by Collinsonia in a remarkable degree.

The symptoms existing between congestion of the pelvic viscera and the heart, are always worthy our attention. Collinsonia is not inferior to any remedy when this complication obtains. In such cases it is the rival of *Aloes*, *Æsculus*, *Nux vomica*, and *Sulphur*.

THE RELATION OF ABNORMAL STATES OF THE HEART TO ABNORMAL CONDITIONS OF OTHER ORGANS OF THE BODY.

THE subject of this paper appears to me a most vital one. It closely concerns the etiology, diagnosis, and especially the therapeutics of many of the diseases of the human body. Not all the disorders of the various organs commence in those organs. They often have their initial starting point in other and often remote organs. This is a consideration which we should always take into account in our diagnosis. But even if a disorder does commence in the liver, for example, it sometimes occurs that owing to the fact that another organ has been sympathetically affected, the original disorder is continued by the morbid condition of the one secondarily affected.

With this preamble, I will now discuss the subject I have chosen. There is a physiological condition of the heart which we call normal. This is when it beats at the average rate of 72 per minute; when the beats are regular; when the blood-pressure does not exceed or go below the normal standard. Any deviation from this normal standard tends to disturb the equilibrium of the circulation in some, if not all, the organs supplied with the blood.

If the beats of the heart are too strong or too frequent, in time arterial congestion must obtain in those organs, or the one organ most susceptible to morbid impressions. The only restraining influence to this lies in the vaso-motor centre. This centre soon becomes stimulated by the increased amount of arterial blood, and an attempt is made to stem the current by the vaso-motor constrictor nerves, which go out from the centre to every organ. They cause a contraction of the smaller arteries, and thus prevent the abnormal pressure which constitutes congestion. But if the heart persists in exerting its excessive force, the constrictors finally give way, and the arterioles are flushed, resulting finally in inflammation or extravasation.

Take the opposite condition—that of a weakened heart. Here the systole is destitute of its normal power; it does not force the blood through the arterial system with sufficient force; they are all the time partially empty.

No organ receives its proper amount of arterial blood. It is not propelled into the veins with force enough to drive the blood back into the heart, and two conditions surely obtain, namely, arterial anæmia and venous stasis. Now, as I said before, the bearing of the above facts in diagnosis and treatment is of the greatest importance. On examination of a patient, as soon as we locate the seat of the organ diseased, the first question is, Did the disorder originate in that organ?

Was there a local irritant cause? If we cannot decide as to the local origin, we must get a history of the patient's condition previous to the local disorder. Are all the other organs of the body in a healthy state? If we find they have been and are now, we must then interrogate the great central organ of circulation. Does the heart beat with normal force and frequency and rhythm? If not, how long has it been beating in an abnormal manner? Is the heart too large, too thin, or are its walls too thick? Is there any valvular lesion? Is it a nervous or an organic disease which affects it?

Not until all these questions are answered by an examination—exact and scientific—can we diagnose with any certainty the nature of the affection now located in the diseased organ. In order to illustrate this subject I must draw copiously upon our medical literature and upon my own experience, and I shall try to give cases which will further illustrate the matter under consideration. That there shall be some method, I will take up briefly each important organ, beginning with

THE BRAIN.

In many febrile states, even when the heart is normal, the hot blood is thrown into the brain with abnormal force. Not only the cerebral mass, but its meninges are stimulated and irritated to the verge of inflammation. Delirium ensues, and often cerebritis.

This often occurs in pericarditis. The hard-bounding pulse, the flushed face and injected eyes demand that we shall subdue the un natural force of the heart.

Before physicians knew the value of Aconite and Veratrum viride, they believed it necessary that the volume of the blood should be lessened by venesection. It cannot be disputed that, in such cases, moderate bleeding did ward off serious damage, but such a practice can now be safely abandoned. Under the timely influence of Veratrum viride the heart's action becomes slower, softer, and soon the blood becomes cooler, and reaches the brain in less quantity.

In most cases of active congestion the vaso-motor constrictors prevent undue distension of the cerebral arteries. It is when they fail in restraining power that Belladonna should be given to aid the heart-restraining power of Veratrum or Aconite.

Chronic hyperæmia of the brain is often kept up by an irritable heart, from functional irritation of cardiac ganglia or muscular hypertrophy of that organ. Here, in order to relieve the oppressed brain, we must quiet and restrain the heart by the use of Aconite, Gelsemin or Belladonna.

Directly opposite in its results is the effect of a weak and irritable heart. Its propelling power is below normal. It does not fill the cerebral arteries, and a condition of cerebral irritation obtains.

Delirium tremens, the delirium of typhoid fever, and certain forms of insanity depend on a weakened heart. An extreme degree of cardiac debility causes coma, dementia and that peculiar condition called the hydrocephaloid state. Even in true hydrocephalus, we find the former condition. In such cases cerebral remedies are useless. We must increase the working power of the heart by food and stimuli, aided by cardiac tonics.

Of these Digitalis, Phosphate of Strychnia and Phosphorus are the most important.

Case I.—A child, 9 years of age, had an attack of acute hydrocephalus, which was treated with Belladonna and Helleborus. But the stomach was so irritable that scarcely any food was retained for two weeks. Feeding per rectum was rendered futile by paralysis of the sphincter. Only during the third week was food retained, but instead of convalescence a semi-comatose condition set in. The heart's action was very feeble, irregular and intermitting, and the surface of the body pale and cold. In this case the administration of Digitalis and Iron in small doses induced a rapid change for the better and a quick recovery.

Case II.—A man, aged 55, had a run of sewer-gas fever, lasting six weeks, under regular treatment. The friends became dissatisfied, and placed me in charge of the case. There was no fever, but complete paresis. He could not see across the room; all objects appeared in a fog. He could speak only in a low whisper. He was deaf, and had lost the sense of taste. He lay all day motionless, except when turned over by his nurse. There was general anæsthesia. He passed urine involuntarily, and his bowels had not moved for a week. He had been filled with Quinine and Iron, beef-tea and eggnog, given to repletion.

The heart-sounds could scarcely be heard, its beats very irregular, the pulse scarcely perceptible, yet under the use of an acid solution of Phosphate of Strychina and Digitalis he made a rapid recovery.

In that excessive anæmia of the brain, which obtains in mania a potu, when anodynes, sedatives and the stimulus of food fail to calm the patient and cause sleep, Digitalis in potent doses will change the condition like magic, by causing calm and slower beating of the heart, enabling it to feed the starving brain with blood. In the treatment of sleeplessness from mental overwork, in persons of weak and dilated heart, a few drops of Digitalis, Convallaria, or Veratrum album will have a better effect than all the anodynes in the pharmacopœia. In old persons with a tendency to apoplexy, especially when

the arteries are rigid and brittle, the condition of the heart should be closely watched. As the arteries grow smaller and more atheromatous, the blood-pressure increases to an enormous extent. The heart beats with phenomenal force, and unless it is soon subdued rupture of a cerebral artery and extravasation will surely occur. The remedy in such cases is Veratum viride. It acts with a celerity which will astonish those not accustomed to use it. But it must be given in large doses. Five drops every half hour are none too much. Suspend the medicine as soon as the heart beats normally. I have never seen the slightest unpleasant effects from such doses, and I am sure I have often averted apoplectic attacks.

An opposite condition, once called "serous apoplexy"—now known as senile anæmia of the brain—is caused by a condition of the heart known as senile degeneration—a kind of fatty degeneration. So long as a sufficient number of muscular fibre remains unchanged, the attacks of coma and dementia can be warded off by Digitalis and Arnica, for Arnica is one of the best cardiac tonics we possess in such conditions.

THE LUNGS

are so closely connected with the heart that any deviation of the latter from a normal state will surely create an abnormal condition in the former.

Arterial congestion of the lungs attends cardiac excitement or inflammation of the heart. In the quick-acting, irritable heart, when the pulse is 100 or more, and hard without fever, the lungs are congested. It is this condition which precedes or attends phthisis pulmonalis. In true cardiac hypertrophy there is a constant congestion of the lungs. In both conditions pulmonary hæmorrhage and inflammation may occur from slight exciting causes.

In order to prevent or arrest such attacks, the heart must be treated by medicines which modify its abnormal action. Aconite and Veratrum viride are the two chief agents. It does not require the presence of febrile temperature to indicate them. We must use them in such doses as will cause the heart to resume its normal rate and force.

Cactus, Lycopus, Adonis, Convallaria and Oleander may be indicated. But the efficient remedy must be one which depresses the action of the heart.

When death occurs in pneumonia, it is generally from heart-failure. The aim of the physician is, after the first or inflammatory stage is passed, to sustain the weakened heart by appropriate food and stimulants.

But food and alcohol are not all that is needed. Some direct medical

tonic must be used, among which none are so potent as Digitalis. Under its influence, in proper doses, the failing heart slows its rapid feeble beating. The heart-muscles make a more ample sweep and throw the life current to the famishing lungs, hastening resolution, and preventing collapse. Aided by Phosphorus and Strychnia to strengthen the respiratory muscles, the patient recovers.

There are cases when heart-failure comes on suddenly; when the half-paralyzed heart struggles with the congealing blood in its cavities; the pulse is imperceptible, and a cold sweat covers the body.

There is not time for Alcohol or Digitalis to act. Then we must hasten to administer that most potent remedy, Glonoin. A drop of the tincture—the $\frac{1}{100}$ of a grain—is placed upon the tongue, and in four or five minutes the heart rallies. Then give Digitalis or Caffeine and watch, lest the action of Glonoin ceases before that of Digitalis begins. Fifteen or twenty drops of Digitalis or five grains of Caffeine are none too large a dose in such cases of imminent danger.

THE LIVER.

When the heart supplies the liver with blood in sufficient quantity, the bile is secreted in normal amount. But in fevers attended with greatly increased action of the heart and in concentric hypertrophy, that organ becomes the seat of active congestion. The first result of such congestion is to cause an increased flow of bile. This is one cause of the bilious diarrhœa in children and adults. The hot blood forced into the liver acts like a drug stimulant. Aconite generally relieves this condition by lowering the action of the heart.

Passive congestion is more common, and is generally caused by some mechanical impediment to the return of blood through the veins to the heart. Examples of congestion arising from this cause are most frequently met with in persons with organic diseases of the valves of the left side of the heart. In such persons it often happens that when the circulation becomes much impeded the liver grows larger, so that its edge can be felt two or three inches below the false ribs. The turgid state of the capillary vessels in the lobular substance of the liver and the slowness of the current through them impede, however, the secretion of bile, so that it often happens that after a few days these symptoms are succeeded by a sallowness of complexion which, in some cases, passes into decided jaundice. Not only do we find organic diseases of the heart causing jaundice, but a weakened heart from any cause will have the same effect. Now in such cases neither the congestion, enlargement nor jaundice can be removed by hepatic medicines alone. They may temporarily restore the secretion of bile, but a cardiac medicine must be given to effect a cure.

In any and every case of congestion of the liver and jaundice, always examine the state of the heart. Find if its action is strong and regular. If not, give Digitalis, and you will see a change for the better as soon as the heart feels its tonic influence.

Case I.—A man, aged 50, consulted me for a jaundice of several weeks' duration. The stools were clay-colored, and the urine saturated with bile. The liver was much enlarged, with soreness and heaviness. The heart's action was feeble and irregular. No disease of the valves. He stated that the heart trouble preceded the jaundice. Under the use of ten drops of the 1x of Digitalis every two hours he recovered in a week.

Enonymus, one of our best new remedies for passive congestions of the liver, jaundice, etc., contains an active principle—Enonymin—which is a cardiac tonic. This accounts for its value in such disorders.

Chionanthus and Chelidonium may contain a similar principle.

Prunus virginiana, the bark of the wild black cherry, removes jaundice by virtue of its power to tone up and regulate a weak heart. Sometimes the jaundice, from suppression of bile, causes cardiac symptoms denoting debility. This is due to the toxic action of the bile floating in the blood, and is a kind of poisoning. Rohrig has shown that it is the glycocolic and taurocholic acids which slow the pulse. It acts upon the ganglia in the heart. Legg found that these acids greatly lowered the blood-pressure. Now it is evident that cardiac tonics are needed just as much where jaundice was the cause of the slow and weak heart. But in this case the cardiac remedy should be alternated with a hepatic remedy, as Digitalis with Podophyllum, or Enonymus with Chelidonium.

THE STOMACH

feels the bad influence of a weakened heart as soon as any other organ. There is a dyspepsia due to cardiac debility that is unmistakable. The symptoms are great sinking sensations and weakness in the epigastrium. The stomach will not tolerate or digest the simplest food. The extremities are cold and livid; the pulse weak, irregular or intermitting; the mind despondent and irritable.

Now all the pepsin compounds, bismuth or dieting will not cure such cases. We must energize the heart and the pneumogastric nerve. The alternate use of Digitalis and Ignatia, or Strophanthus and Strychnia, will soon remove the passive congestion of the stomach.

THE KIDNEYS.

These organs probably suffer more from heart disease than any others. Acute congestion may arise from hypertrophy, that form of enlargement in which there is a thickening of the walls of the left ventricle, causing an increased force of the blood-current. If there is at the same time an incompetency of the aortic valves, the blood-current is allowed to spend its full force on the arterioles. The result in this condition is an undue distension of the small arteries, atheroma, aneurisms and extravasations of blood from rupture of the arterioles. In acute congestion of the kidneys these organs, when cut into, show scattered dark points, or minute ecchymoses, and there is a discharge of dark-colored, watery blood, showing an œdematous condition. Microscopically we find evidences of engorgement of the blood-vessels and an infiltration of serum into the interlobular tissue. In the tubules the epithelium is found to be granular, and the lumen is choked with coagulated fibrin.

Here we have the first stage of a form of Bright's disease, and we can appreciate how important it is that we should control a heart which forces an abnormal amount of blood into the delicate tissue of the kidneys. It will surely cause inflammation, unless the power of the heart is lessened. Beside hygienic treatment, the prohibition of overeating, the use of Alcohol and excessive physical exertion, we must lessen the heart's action by the use of Aconite, Veratrum viride, Cactus, Lycopus, Cyanuret of Zinc and others. It must not be forgotten that in the majority of cases cardiac hypertrophy has its origin in the kidneys, or in an excessive arterial tension in those organs. This tension or diminution in the size of the arteries, with or without atheromatous rigidity of their walls, always increases the action of the heart to overcome the resistance, and from this increased action we get either thickening or thinning of the left ventricle.

Hypertrophy with dilatation implies always a decreased force in the arterial circulation, and this decreased force always leads to that most unfortunate of all conditions of the kidneys—passive or venous congestion. The results of this venous stasis are a proliferation of cells in the connective tissue of the kidneys and every organ where this condition exists; the organs become larger and denser; on section a glutinous fluid exudes, and in time a distinct cirrhosis results. Thus we get cirrhosis of the kidneys, the liver, the spleen, and even the uterus.

This interstitial nephritis may also be accompanied by metastatic nephritis from embolism. This affection of the kidneys from heart disease, especially valvular failure, but equally from any other cause

leading to venous congestion, has been fully investigated by many leading pathologists.

The effect, says Fothergill, of venous stagnation on the kidneys—of structural changes, induced by venous hyperæmia—points out how very important it is to secure good acting power in the heart, not only for its own maintenance, but to avoid and delay as long as possible the venous congestion which inaugurates the renal changes. The importance of securing good ventricular contraction and good circulation is demonstrated unanswerably, and the therapeutic importance of that list of agents which induce increased ventricular contraction is enhanced. We have seen that heart-failure is the turning point in the progress and prognosis of chronic renal disease when a cause of heart disease; and now we see what a disaster impeded circulation from heart-failure is, in ultimately overtaxing the organ already enfeebled.

The clinical importance of avoiding venous congestion from heart-failure, of improving the action of the heart by aiding in securing compensatory hypertrophy, or delaying so long as may be the venous congestion, no longer to be averted, is demonstrated only too clearly.

In heart disease the appearance of albumen in the urine, with exudation casts, marks the inauguration of a secondary process which will work evil, and that, too, in no long time. In a little while chronic Bright's disease is firmly established, with all its consequences, and it may not be possible always to determine which lesion came first in the order of time. It matters not which has priority, the failing heart must be treated. The condition known as dropsy, when not idiopathically renal, is always due to a weakened heart. This weakness may be due to fatty degeneration, or to dilatation from continued distension. So soon as there is failure in the heart's power, we get deficient circulation. Limiting my remarks to the condition of the kidneys, the first effect of a deficient arterial circulation in these organs is venous congestion. In the first place, we get obstruction in the renal vein, and, from that, albumen and exudation tube-casts. But this is not all: venous congestion affects the nutrient branches of the renal arteries and impedes the flow through them, interfering with the elimination of solids. While these positive results follow from venous congestion, we get negatively diminished bulk of urine. This does not result altogether from venous congestion, for the narrow continuations of the bloodvessels from the glomeruli prevent its acting very strongly. It is chiefly the result of diminished arterial pressure. Venous congestion means diminished arterial pressure. The blood lying in excess on the venous side, the arteries are not so well filled; this tells on the arterial pressure, which results in diminished bulk of urine—

thence dropsy. I have thus described the pathological condition in the kidneys that it may be clearly seen that, in order to treat dropsy successfully, we must restore the heart to its normal power. We must make it force the blood into the renal arteries, until we get normal pressure therein, before we can increase the bulk of the urine. It will do no good, but rather make matters worse, if we give medicines which have a direct action upon the kidneys.

Those are only useful in idiopathic renal disease before the heart-failure has set in. It is a notable and important fact that all those medicines which are really useful in cardiac dropsy are those which, by their physiological action, increase the working power of the heart. Another notable fact is that all these medicines were first known as diuretics, and their influence on the heart was discovered later. The following medicines I will mention in order of their value. In their early history they were classed as pure diuretics. Later investigations show that they do not affect the kidneys as diuretics until they have increased the force of the heart's contractions and the pressure of the blood in the arteries, and removed the venous congestion. It may be asked: "Are they all strictly Homœopathic to the conditions which result in cardiac dropsy?" I answer, "Yes."

1. Their primary effect, when taken in pathogenetic doses, in healthy persons, causes abnormally increased action of the heart, increased blood-pressure in the arteries, congestion (arterial) in all organs, and even aneurisms and extravasations from arterial capillary vessels.

2. This condition, if long continued, can result in no other than a reaction or secondary condition, which is just as much a drug effect as the primary. While the primary condition resembles that brought about by a hypertrophied and thickened heart, the secondary state is similar to that in which the muscular fibres, unable to bear the strain, have become degenerated, and fail to contract with sufficient force to fill the arteries, resulting in venous stasis everywhere. Now, I hold, and have taught for twenty years, that this secondary state, caused by drugs, should be made the basis of drug selection, according to the homœopathic law just as much as is the primary.

Digitalis is now, and will probably be for centuries, the principal drug in this category. You are all familiar with its action on the heart and the general system. You know that it stimulates the cardiac muscles to unnaturally forcible contractions, and that were it not for the power it possesses to contract at the same time the distal arteries, its extreme effect would be to cause active congestion, inflammation and hæmorrhage in every important organ. This arterial contraction reacts upon the heart, increasing the strain on the walls of the ventri-

cles, until they close in systole and death. But if this fatal result does not occur, the overstrained ventricles relax and dilate, their muscular tissues become thin and fail to fill the arteries. After this the result is venous congestion and effusion of serum.

Adonis has an action on the heart and circulation similar to Digitalis, and often acts in cardiac failure and its resulting dropsy better than the latter.

Convallaria resembles both, and will often remove cardiac failure when they have failed.

Strophanthus, the newest cardiac drug, has been used with very excellent success. It does not contract the arterioles as much as the others, and is considered safer in many respects.

Apocynum cannabinum has been used for a century as a potent remedy in dropsy, but it is only recently that its active principle, Apocynin, has been found to be an energetic heart-tonic, acting like Digitalis.

Cactus, so favorably known to us, is a cardiac stimulant, causing veritable spasms of the spiral muscular fibres of the heart. It is largely used to combat symptoms similar to its primary and secondary effects, and in certain cases will remove cardiac dropsy with great celerity.

Helleborus niger was used among the ancients as a potent remedy in dropsy. Singularly they relied as much upon its hydragogue as its diuretic effects. It is now well known that its alkaloid, Helleborine, is a powerful cardiac stimulant in its primary action.

Iberis amara, although not much used, has a favorable influence in cardiac dilatation attended with dropsy.

Scoparius, or "Broom," is an old and valued diuretic. It was once the chief medicine in obstinate dropsies. Within a few years its alkaloid, Sparteine, has taken a place alongside of Digitalis, and shown in many cases a powerful action on the kidneys.

Oleander with its active principle, Neriein, has been found to belong to the same class as the above, but it has not yet been used much in disease. It is predicted that it will rival Digitalis.

Caffeine is probably the most powerful heart-energizer yet discovered. In massive doses it will rapidly tetanize the healthy heart. In threatened cardiac paralysis, five grains every two hours have apparently snatched the patient from the jaws of death. In those cases of rapid heart-failure, which sometimes occur in pneumonia, typhoid fever and extreme dilatation, two grains every two or three hours have restored the force and rhythm of the heart in a very short time.

Sterculia (Kola), an African nut, which contains Caffeine and Theobromin, bids fair to rival any of the above. The time will come when the powerful alkaloids of all these cardiac medicines will be used instead of the crude drug.

THE UTERUS AND OVARIES.

It may seem strange that I should connect diseases of the uterus and its apendages with cardiac disorders. It is not so much the acute disorders as the chronic which I shall discuss. No one will deny that inflammatory affections of the heart do have some influence on uterine pathology. We often find acute arterial congestion of the uterus and ovaries, acute hæmorrhage and even dysmenorrhœa aggravated by an enlargement of the heart, or even undue excitement of that organ. Witness the subsidence of these conditions when the woman is put under the influence of such cardiac sedatives as Aconite, Cactus, Gelsemium or Veratrum viride. But I will not further discuss this point, but proceed to the consideration of chronic maladies of the uterus. The scientific and talented Dr. Mary Putnam Jacobi, in a notable paper published several years ago, observed that "the first link in the chain of uterine pathology is venous stasis." To this cause, she asserts, are due the nutritive changes, the displacements, the flexions, many amenorrhœas, dysmenorrhœas, and hæmorrhages of various kinds which attend uterine disorders. If you will recall what I have said of the changes in the kidneys caused by venous congestion, you will more readily comprehend the above statement. Now, as in the kidneys, venous stasis of the uterus is not always due to a failing heart. It may originate in some local disorder or traumatic condition.

It may originate in suppressed menses after miscarriage or post partum. It may be due to a sudden cold or powerful emotion, when the vaso-motor nerves are irritated, resulting in spasm of the arterioles. But these local states may finally result in heart-failure, just as undue tension of the renal arteries may cause such changes in the kidneys as will soon result in some form of Bright's disease.

While we are treating these acute disorders with Aconite, Belladonna, Cactus, Veratrum viride, Aurum or Glonoinum, we should be on the watch for that weakness of the heart, more common in women than men, which so often attends the failing health, resulting in any uterine ailment, for as soon as the circulation is weakened the local disorder tends to become chronic. So soon as the heart loses its power of propelling the blood freely and forcibly into the arteries of the uterus, pathological changes are sure to be perpetuated. If a weakened heart has anticipated any uterine disorder, that organ cannot long remain free from disease. In such cases local treatment, no matter how skillfully applied, will do but little more than palliate.

If women get up from a miscarriage or confinement with a loss of the heart's normal power, as they are sure to do if they have lost

much blood or have not been properly fed or nursed, the acute congestion of the uterus will change to venous stasis, unless we tone up the heart and increase the blood by means of Iron and Digitalis, China and Nux vomica, with nutritious food, fresh air and proper exercise. If the local weakness results in retroflexion, the pessary will not cure until we restore the circulation to its normal force. That condition, called areoloa hyperplasia, is the same as hyperplasia of the connective tissue of the kidneys. Both are caused by venous congestion. In the former we have scanty menses and sterility; in the latter, Bright's disease and dropsy. If there are structural changes in the heart, organic weakness, chronic venous stases in the uterus and ovaries become fixed, rebellious to treatment, and often incurable.

There are two points I desire to emphasize relating to the treatment of chronic disorders of the uterus. 1. That, in connection with proper hygienic surroundings, good diet, a pure air and good climate, we should always prescribe some one of the known and trustworthy cardiac tonics. Those which have an affinity for the reproductive organ, as well as the heart, should obtain a preference. Among the most important of the latter class are *Nux vomica*, *Ignatia*, and the alkaloid common to both, *Strychnia*. There is no drug which is a better energizer of the heart than Strychnia. Under its use the hypertrophied and dilated heart decreases in size and increases in thickness. At the same time the tonicity of the uterus and its appendages is increased and the circulation in those organs equalized.

Convallaria and Lilium tigrinum come next in order. The former, as shown by recent provings, acts upon the heart similarly to Digitalis, while it does not cause the same amount of arterial tension. It has also a specific action on the uterus and ovaries. During its primary action they are stimulated and congested. During its secondary action, when the heart has become enfeebled, those organs become engorged with venous blood, making them subject to nutritive and structural changes.

Lilium has a similar action, but differing enough to enable us to differentiate between them. Cactus has a specific affinity, which is well known to all of you.

Strophanthus will, I predict, when better known and proved on the female organism, prove to be a valuable remedy in such cases. Digitalis, especially when associated with Strychnia or Iron, is of inestimable value in chronic cases, complicated with muscular atony or blood impoverishment.

2. The above remedies, when aided by those medicines which have a specific affinity for the reproductive organs, like Sepia, Calcarea,

Cimicifuga, Secale, Aletris, Hydrastis and Viburnum, enable us to treat successfully all the non-surgical diseases of the uterus.

I fear that I have not presented this subject as forcibly as I should. It demands a more facile pen and a wider experience; but if I have given you food for serious thought and a fuller appreciation of the value of restoring the normal integrity of the circulation, I shall be satisfied with my endeavor.

OERTEL'S TREATMENT OF WEAK HEART.

THE term "Oertel's treatment" has become as familiar to us as "Banting's" treatment, for obesity once was and is also as much misused as the latter has been. The "terrain treatment" was first suggested by Oertel, and had an enormous patronage, and it was only natural that the indications requiring such a treatment were greatly overestimated, and were not confined to those laid down by originators. Almost every person suffering from cardiac troubles thought that in this treatment he had at last found a panacea which would be sure to rid him of his trouble, and therefore hastened to one of the numerous places where the treatment was administered; once there would strain and overtax his already feeble heart until, in a few weeks, the penalty of his ignorance was paid by death.

In opening the debate Oertel gave a sketch of his experiences which I introduce here as shortly as possible:

Changes in the cardiac muscle which are due to disease must be considered quantitatively as well as qualitatively. The first consists in an increase of the heart's muscle, which is both absolute and relative, and may affect but certain portions or the whole heart. This increase of the heart's muscle may be usually traced to an increased activity of the valves, which is caused by pathological changes, and may be looked upon as a hypertrophy of compensation. The treatment, however, must not consist in a reduction of this hypertrophy; rather it is the duty of the physician to retain it, or, if it be lost, to call it forth again. Where symptoms of compensatory hypertrophy are not well marked, symptoms of a decrease of the heart's muscle-insufficience will soon be observed, and will contraindicate further treatment in this line. Qualitative changes of the cardiac muscles are due to inflammatory processes, defective nourishment or degeneration, which may be caused by various diseases. In such cases the muscular fibres themselves show changes in their morphological composition. The most severe form of this kind of change in the heart's muscle is that known as fatty degeneration of the muscular fibres. Finally, mention

must also be made of one other change of the substance of the muscle, viz., the substitution of one part of the muscular tissue by connective tissue. Cardiac troubles caused by acute infectious diseases were not taken into consideration. The presence of chronic diseases of the heart's muscle is recognizable in a decrease of the strength of the heart and an insufficience of the muscle. The disease always takes the phase of circulatory disorders. The principal troubles which are caused by a decrease of the heart's strength are anæmia, thrombosis in the veins, collection of blood and serum and kidney affections.

The prognostic conclusions in such diseases must be based upon the severity and kinds of defects of nourishment observed, and upon other complications which exist outside the chronic diseases of the heart itself. The "curative method" instituted by Oertel for this class of diseases may be divided into two sections—the dietetic treatment and the mechanical treatment.

The first is regulated by the nutritive or fatty condition of the patient. The following are the symptoms observed: 1. Abnormal condition of fat, plethora, with a diminishing of the heart's strength. The diet in such a case should be an increased amount of albuminoid substances and a less amount of fatty substances. There need be little or no change in the amount of fluid given. 2. Fatty degeneration, accompanied by serious plethora. The dietary indications in this case are as follows: Increase of albuminoids, decrease of fat-producing substances, and also a decrease in fluids. 3. Fatty degeneration in older subjects, accompanied by hydræmia, in which cases there is not alone a lessening of albuminoid matter, but also a decrease of fat. Here one must also give a large amount of albuminoids, together with a moderate or, in some cases, even a decreased amount of carbohydrates. At the same time the amount of fluids must be considerably lessened. 4. Existing inanition; weakness, with diminished strength of the heart; anæmia and hydræmia. The diet in this case should also consist in an increase of albuminoid matter, and also an increase of muscle-producing food, until a state of muscular hyperplasia supervenes.

The mechanical treatment forms an accompaniment to the dietetic treatment. Oertel first advises the practice of rising from various grades of a stooping or bending posture. Other authorities, such as B. A. Schott, recommend passive movements, also movements requiring a certain amount of strength.

The mechanical treatment is said to give a certain motoric impulse, and also to annul any circulatory disturbances. This result is reached by an increase of the heart's activity. The heart's power of aspiration is also increased; and as, during these movements, more venous blood is

pumped into the larger veins, the blood flows in greater quantities into the right heart than when the body is at rest.

If this increase of the heart's activity is kept up for some time, and the pressure of blood in the arteries becomes increased, it will cause, by a reflex action, a compensatory enlargement of the arteries, and a decrease of the tension of their walls. The outflow of blood from the left heart is facilitated, the quantity of arterial blood is increased, and the quantity of venous blood is lessened. The lungs are also benefited by the latter. There will be a marked expansion of the thorax during inspiration, an enlargement of the surface of the lungs and much greater ease in respiration. All these symptoms are far greater and more marked when a rising movement has been practiced than when any other movement has been resorted to.

Where it is desirable to increase the strength of a weak heart, it is of first importance to decrease, if possible, the work required of it. With this end in view, Oertel does not advise a diminishment of the quantity of blood, but a decrease, as far as possible, of the amount of water in the system. This may be accomplished by decreasing the amount of fluid food and drinks, and by increasing the quantity of fluid given off by the body. The latter may be accomplished by both increasing the flow of urine and by causing profuse perspiration by means of muscular exercise. The increase of urine will depend on the strength of the heart in a measure, for if the latter is very weak, the functions of the kidneys will be impaired.

Dr. Oertel now endeavored to explain the indications and contraindications for his method of treatment. Sclerosis of the coronary arteries is no contraindication—rather an indication both for the mechanical as well as the dietetic treatment. The regular diet and methodical movements, such as walking, etc., have an undeniably beneficial effect upon the cardiac muscles in all chronic cases, yet the practice must be resorted to with the utmost caution. Chronic and frequently relapsing endocarditis, weakness of the cardiac muscles, long-standing compensatory and valvular troubles, cardiac aneurism, general atheroma and chronic diseases of the kidneys, in long-standing cases of heart-weakness, form the principal contraindications for the employment of Oertel's method, or may be taken, as Oertel himself says, as a sign that the treatment should be used but moderately. In all cases, however, he says, it is well to proceed slowly and cautiously, unless all symptoms which would either indicate or contraindicate its use have already been discovered.

The second speaker on the subject was Prof. Lichtheim, of Berne. The stand taken by him in the case was different from that of Oertel in many

particulars, although theoretically he had to agree with Oertel in many instances. He formulated his own observations in the following conclusions:

1. Oertel's method is a veritable panacea in those cases of chronic heart disease which owe their origin to want of proper exercise.

2. In diseases of the heart which, on the other hand, are due to overexertion and continual strain on the body, or in any case where the increased expansibility of the cardiac muscle is due to other causes, Oertel's method is not of the least value. Bodily exertion should be allowed only to a very mild and gradual degree in compensatory affections. Great care must be taken to prevent undue dyspnœa. Such cases must be treated with far greater caution than those with valvular troubles alone.

3. The medical treatment of compensatory affections with Digitalis, Strophanthus and Caffeine must be recognized as the most reliable manner of treating such cases. Where this treatment fails the "mechanical-dietary" treatment will also be powerless to render any aid. In its action in causing the absorption of dropsy, Oertel's method can augment the medical treatment, but in no case can it ever substitute it.

4. During the period of intact compensation all medication is superfluous, aside from possible symptomatic indications. It is in such cases where the mechanical-dietary treatment may prove to be of great value, and Oertel's method may be looked upon as a model of such a treatment.

The discussion that followed was to the effect that Oertel's treatment cannot be proceeded with too carefully; it should never be used without a thorough knowledge of all the patient's symptoms. The unanimous wish expressed was that precise indications warranting the use of the treatment should be formulated.

It is evident that this treatment should not be undertaken by any patient without the watchful care of a competent medical attendant. The altitude at which such treatment is conducted is an important factor. Hill-climbing should be commenced at a low altitude, and not until the heart has become stronger should mountain-climbing at a moderate altitude be attempted.

At the recent Congress of German Physicians in Wiesbaden considerable time was given to the discussion of Oertel's treatment of chronic disease of the cardiac muscles. In addition to the use of diet, great stress was laid upon the employment of gymnastic measures, especially those which imply the practice of the rising from various grades of a stooping or bending posture. As a means of attaining this result, mountain-climbing has been strongly recommended, but it is needless

to say that the class of cases to whom a mountain tour is practicable is very limited. As a consequence, various contrivances have been devised for replacing mountain-climbing, among the best of which is one discribed by Dr. von Corval in the *Therapeutische Monatshefte* for August, 1888. Lauder, of Stockholm, had already recommended an apparatus on the principle of a treadmill for fulfilling the indications in the treatment of various heart affections, and his apparatus, by unloading the venous circulation, through improving the general condition of the circulation, to that extent reduces the work of the heart, and consequently leads to strengthening of the heart-muscle. Von Corval points out that one of the great advantages in mountain-climbing is the simultaneous action of the arms through the use of Alpine-stocks and the legs, for by means of this the circulation in the areas of both the inferior and superior vena cava is accelerated. This object is attained by the use of a treadmill, whose steepness may be altered at will, and by the use of two vertican movable bars, which are grasped in the hand, and serve to assist the patient in ascending the inclined plane. At the commencement of this treatment the treadmill should be nearly horizontal, and the increase in steepness only gradually accomplished and with careful attention to the character of the heart's action. Especial stress is also laid on the fact that an inspiration and expiration should accompany every two steps, so that, therefore, the rapidity of the motion should not exceed sixty to seventy steps in a minute. The cases for which this mode of treatment is especially valuable are those of fatty heart, without degeneration of the heart-muscles, especially when the affection results from immoderation in eating and drinking. Dilatation of the heart from strain or valvular affections is not improved, but may be seriously damaged by this treatment. It is readily seen that, in being capable of careful regulation, this method of heart-gymnastics is preferable to mountain-climbing, while being capable of employment by many for whom a mountain tour is impossible.

CARDIÆSTHENIA.

I THINK this to be a better and more comprehensive name than irritable heart, for a healthy heart may be irritated by disorder of other organs, while the nervous structure of the heart may be weakened when other organs are healthy.

My observations and my studies of such authors teach me that organic diseases of the heart are more frequent in other countries, while in this country the purely functional disorders are far more frequent than abroad.

I cannot say that I believe that cardiæsthenia originates in the heart. On the contrary, it is nearly always found in those persons who have been subject to violent mental strain, or the victim of the irritating and depressing emotions. Nor do I believe it arises from any morbid condition of the brain. Its causes are psychic rather than physical.

A very suggestive paper was lately read before the New York State Society by my colleague, Dr. J. W. Dowling, whose experience as a specialist and close observer is valuable and confirms my own views as to the frequency of cardiac neurœsthenia in America. With Dr. Dowling's consent I give his paper:

IS THE AMERICAN HEART WEARING OUT?

The community, in many instances the nation, has been so frequently shocked of late by announcements of sudden deaths of men high in public and social position, from diseases of the heart, that it seems not surprising that the question should be asked: "Is the American heart wearing out?" Why are these men thus smitten in the prime of manhood, in the prime of usefulness, in many instances without even the opportunity of giving a parting word to loved ones and friends? Certain it is that disease of the heart is more common among us than formerly, or that the physicians of the past failed to recognize this malady when it did exist. In the majority of cases of sudden death the diagnosis of disease of the heart is accepted without comment, without surprise, notwithstanding the announcements made that up to the time of his death the deceased was apparently in the best of health. It is rare that an investigation is made as to the cause of this disease of the heart, or the question asked why this cardiac disease remained undiscovered till death had placed it beyond the power of man to arrest its progress. No well-informed physician will claim that the sound heart becomes diseased suddenly, or that even the most obscure disease of that organ has not associated with it certain physical signs which will readily enable the expert diagnostician to recognize its existence. Scarcely a day passes but the morning papers contain obituary notices, of which the following extracts are samples:

"On Thursday he went to his office feeling quite well, but on getting up yesterday was so weak that he returned to bed, and died in a few minutes. The cause of death was heart disease."

"He retired to bed at night apparently in his usual state of health, and was found dead in the morning. The verdict of the coroner's jury was, 'Death from disease of the heart.'"

"On Tuesday last he contracted a cold, but attended to his duties as usual till the last of the week, when pneumonia developed. He grew

rapidly worse, and died on Monday, the immediate cause of death being failure of the heart."

"He sailed from this country in February last in the best of health. He stood the journey well, and was apparently as well as usual till last night, when he was stricken with heart disease and died."

"He left New York but a few days ago for a pleasure trip. As he was about retiring for the night, after a fatiguing journey, he fell suddenly to the floor from a stroke of apoplexy. He lingered till last evening, when he breathed his last. It is supposed that for some time past he had been suffering from disease of the heart."

"Died, this morning, from a complication of maladies, including trouble with the heart and Bright's disease of the kidneys. Although he had been confined to the house for several weeks, his death came unexpectedly to his family."

The object of this paper is to fathom, if possible, the causes of this terrible mortality from diseases of the heart; to call attention to the indiscretions of life which give rise to certain forms of this malady; to show how patients suffering from organic disease of the heart may, by their own unaided efforts, prolong their days in comfort, in many cases even beyond the allotted life of man; to account for heart-failure as the immediate cause of death in many accidental and infectious diseases which, without this factor, would be recovered from, and to explain intelligibly some of the most common forms of diseases of the heart, and to correct certain misconceptions with regard to them; for, in the minds of the laity, the idea is firmly fixed that there is but one form of disease of the heart, and that invariably fatal. Physicians, too, until they have watched patients known to be suffering from serious valvular disease of the heart, and seen them live, perhaps for years, enjoying the ordinary good health of the average healthy individual, and until they have studied and become convinced of the compensating power of nature, untrammeled, in overcoming obstacles to the free circulation of the blood, continue to look with feelings of great anxiety on those of their patients and friends over whose hearts they have discovered a valvular murmur.

In order that those attracted by the title of this article, who believe themselves to be suffering from disease of the heart, may peruse these pages without palpitation of that vital organ, I will commence the consideration of my subject with the positive assertions, founded on an experience covering nearly a third of a century, of which many years have been largely devoted to the special study and teaching of diseases of the heart and lungs, that cardiac disease is not invariably fatal; that many apparently grave forms are entirely recovered from; that

enlargement of the heart is not in itself a disease, but on the contrary is salutary, inasmuch as it is nature's method of overcoming obstacles to the blood-current, either in the heart or elsewhere, this very enlargement, accompanied as it is by increased power owing to the development of additional muscular fibre, sometimes compensating entirely for the obstacle; that, with serious valvular disease developed in childhood, patients have been known to live to be aged men and women, the fathers and mothers of large families of children, in some instances, to the writer's personal knowledge, supporting these families by manual labor requiring at times great physical exertion and mental strain; that with a large majority of those supposed to be suffering from heart disease, that organ is in reality perfectly sound, and, if affected at all, is suffering secondarily to functional disturbances of organs remote from the heart—disturbances which are curable by proper and not too severe hygienic measures; and, lastly, that whenever the attention of the patient is called to his or her heart by symptoms which lead to the conclusion in his or her mind that he or she is suffering from organic disease of that organ, the chances are ninety-nine out of a hundred that the heart is perfectly sound. This last assertion will apply with equal force and truth to the lungs, brain and kidneys.

Diseases of the heart may be divided into two general classes: those originating from an inflammatory process within the heart, and those originating from without. The former result from an inflammation of the lining membrane of the heart, endocarditis; the latter from (1) an extension of a chronic form of inflammation of the walls of the main artery of the body to the segments of the aortic valve, which prevents the return of the blood from this vessel into the cavity of the left ventricle; (2) from an extension of this inflammatory process to the walls of the bloodvessels which nourish the organ, the coronary arteries; (3) from the immediate contact of a toxic element in the blood with the walls of the vessels which nourish the heart, resulting in changes in those vessels which interfere with the nutrition of the organ;* (4) from a diminished amount of the normal ingredients of the blood in the general circulation, which weakens the heart-walls from faulty nutrition, and permits them to dilate, often to such an extent as to render the valves at the various orifices incompetent to

*When this arterial change exists in the walls of the heart, it is never confined to this organ alone; it is a general process, and in some of the vital organs, particularly the kidneys and liver, produces serious changes by developing an adventitious tissue-growth which ultimately seriously impairs the functions of the organs, Bright's disease of the kidneys and certain chronic liver diseases being the result. These are an accompaniment of, and go in hand with, heart disease resulting from this arterial change.

close them; and (5) from great physical strain which, by compressing the small arteries of the body, obstructs the blood-current, thus overdistending the cavities of the heart and resulting in dilatation of its walls.

Added to these may be mentioned certain nervous affections of the heart which are secondary to disturbances elsewhere, and which subside with the removal of the cause.

The first class of diseases of the heart, those originating from within, are common to all periods of life, but occur more frequently prior to manhood or womanhood, and involve almost exclusively the left side of the heart, and more frequently the mitral valve, or that which lies between the auricle and ventricle of the left side, and which, during contraction of the latter, closes and prevents the return of blood into the auricle above. They result from an inflammation of the lining membrane of the organ, the endocardium. This inflammation, endocarditis, is a complication of various acute diseases, which are characterized by the presence of certain acid poisons in the blood. Chief among these diseases is inflammatory rheumatism, or rheumatic fever of some authors. About thirty per cent. of all cases of inflammatory rheumatism are complicated by inflammation of the lining membrane of the heart. The inflammation is more intense along the edges of the valves, from the fact that the sudden closure of these valves brings the margins of their segments into forcible contact with each other; this occurring so frequently, from one hundred to one hundred and fifty times to the minute in febrile conditions, it is readily seen that on the edges of these segments the inflammation would be most intense, owing to this additional cause of irritation. The valve-tips become infiltrated and swollen, and soon develop a growth of fibrous tissue—adventitious tissue. As the inflammation subsides, this newly-developed tissue contracts, changing the shape and size of the segments, with the result either of rendering the valve imperfect or of narrowing the orifice, or both. Thus is established a permanent deformity of the valve or orifice, "valvular disease of the heart," the result being permanent obstruction at that point. If the nutrition be good, the walls of the heart, back of the deformed orifice or valve, thicken by the growth and development of new muscular fibres; the heart is strengthened, and the obstruction is, to a certain extent, overcome. This condition of the muscular walls of course causes enlargement of the heart, which, as was before stated, although the result of disease causing obstruction to the blood-current, is not in itself a disease process, but Nature's method of overcoming obstacles to the circulation of the blood. A patient suffering from valvular disease is crippled; but, if

the nutrition of the heart be good, by avoiding indiscretions and adopting an occupation that does not require great physical strain, by living on a level, as it were, life may be prolonged in comfort for many years. All are liable to the diseases producing this form of heart lesion, whether their lives are good or bad, discreet or indiscreet, but not equally liable by any means. A good and discreet life adds to the resisting power against disease-producing influences, and to the powers of endurance; while a bad and indiscreet life reduces the vitality and resisting power. Those following the latter course are much more liable to suffer by exposure to infection, to sudden change of temperature, and to other disease-producing influences.

The second form of cardiac diseases, or those originating from without the heart, are, save in exceptional cases, the direct result of hereditary influences, or of indiscretions in life, and, by proper knowledge and precautions, can in the majority of cases be avoided, or, if already established, checked in their progress. The portion of this article relating to the indiscretions which give rise to disease processes, which result in premature wearing out of the heart, should be carefully considered, for it is from its perusal that possible good may come, disease be warded off, and life prolonged. Of late years, physicians have paid more attention than formerly to the preventable causes of disease of the heart and of other organs of the body, and the time will come when a careful study of the etiology of the form of disease under consideration will enable the physician so to direct such of his patients as are willing to be guided for good, that these diseases will be arrested in their progress, and often, in those predisposed to them, be prevented, and later this very predisposition may be done away with.

There is a cause for every morbid condition, and the man who discovers these causes, if he have the magnetism to draw around him ardent followers, who, for the love of man, will disseminate his knowledge, will be a greater than Hippocrates, a greater than Galen; for although all concede that the calling which enables one to relieve suffering, and to cure curable diseases, is a noble one, they will concede that one which will enable man to prevent suffering and prevent incurable disease is far more noble.

A terrible bugbear to every one who is fat and short-winded, and who suffers from occasional attacks of pain in the region of the heart, or from palpitation, is fatty degeneration of the heart. It is needless to say that a person may be fat and yet enjoy good health, and that the above-mentioned symptoms associated with obesity are no evidences of this malady, which certainly does destroy many valuable lives. A distinction must be drawn between fatty degeneration of the heart

and fatty heart. In the former there is a degenerative change in the muscular fibres of the heart, a greater or less number of them being converted into fat. In the latter there is a deposit of fat on the walls of the heart and between its muscular fibres. The two conditions may co-exist. The causes of fatty degeneration are faulty nutrition of the organ from a deteriorated or poisoned condition of the blood, or from improper blood supply, resulting from obstruction to the current in the bloodvessels that nourish the heart. The first cause will account for degeneration found where death has resulted from acute or chronic infectious febrile diseases, such as typhoid fever or pulmonary consumption, or from the various diseases in which there is a positive and permanent deleterious change in the constituents of the blood, as in progressive pernicious anæmia, Bright's disease of the kidneys and certain progressive diseases of the spleen and lymphatic glands. The second cause will account for degeneration when the bloodvessels supplying the heart, as a part of a general disease process of the arteries throughout the body, have become tortuous and changed by an inflammatory or degenerative process known as atheroma, and where degeneration results from deformity of the valve at the mouth of the aorta, which prevents its proper closure.

It is generally conceded that recovery is possible from the fatty degeneration accompanying the acute fevers, new muscular fibres being formed which take the place of the old ones which have become converted into fatty débris. But a heart which has become degenerated from the second cause mentioned, arterial change resulting in permanent obstruction to the blood-current, is permanently crippled, and owing to its enfeebled condition, either venous engorgement of the various organs of the body results—often to such an extent as to disturb their functions sufficiently to be incompatible with life itself—or acute dropsy of the lungs, or general dropsy ensues, as a direct result of weakened heart action, and may destroy the life of the patient; or the diseased heart may suddenly fail and stop beating, owing to shock, a fit of passion, overexertion, a sudden change from the recumbent to the upright position, a chilling of the surface of the body, or the contraction of the superficial bloodvessels during the cold stage of ague; and death frequently takes place when the heart-walls are weakened, during an attack of angina pectoris. Several cases of sudden death from fatty degeneration of the heart from each of the above immediate causes have come under my personal observation. This latter disease, angina pectoris, so little understood by the laity, is not, strictly speaking, a disease of the heart, although generally so considered. A person with a perfectly sound heart may suffer from repeated attacks

of angina pectoris. It is in reality a transient disease of the nervous system, an irritation of the nerve-centres from which originate the nerves which supply the walls of the small arteries containing muscular fibres. This irritation causes these vessels throughout the body to contract. The heart is overtaxed, overburdened; it struggles to empty itself; its cavities become overdistended. If its walls are strong, it can withstand many of these attacks. If it be weakened by disease, degeneration, or dilatation, it sometimes fails in its struggles, and stops with its cavities filled with blood. The reason that angina pectoris is so frequently an accompaniment of a degenerated heart and of disease of the aortic valve is that the same condition of the blood, *i. e.*, an excess of urid acid, which it is conceded produces the one, produces the others. This condition of waste material in the blood is the result of functional disturbance of that great chemical laboratory, the liver. And this disturbance is, in the great majority of instances, the direct result of indiscretions of various kinds.

Fatty deposit on the heart and between its muscular fibres, so common as a part of general obesity, hampers the action of the heart by giving it extra work to do, in lifting with every impulse a superincumbent weight. But if the muscular fibres themselves are healthy, they can bear this additional labor, and will even multiply, that they may the better bear it. Ordinary life is in no way endangered by this condition, and frequently, under proper hygienic measures and diet, the superfluous fat will disappear from the heart as it will from other parts of the body.

There is a stage in this process of change in the walls of the vessels which ultimately results in fatty degeneration of the heart, or disease of its valves, which should be recognized and understood, during which stage sudden deaths from apoplexy, the result of rupture of a blood-vessel in the brain, are not unusual, and another stage in which death from "heart-failure" is common in the various acute diseases which are ordinarily recovered from. Preceding the permanent change in the walls of the vessels throughout the body, which is characterized by thickening of their walls, lengthening of the vessels themselves and a diminution of their calibre, is a condition of irritation which produces contraction of the smaller vessels and renders the larger ones more tense than is normal. The heart, to overcome the results of these pathological changes, which, of course, produce obstruction to the blood-current, beats with greater force, and ultimately enlarges to compensate for the obstruction. The tension of these larger vessels is owing to their distension; they are stretched to their utmost capacity. At such a time anything which increases the force and action of the

heart still further endangers the walls of these vessels in parts where they are especially weakened and are least supported by the surrounding tissues, as in the mucous membranes lining the air-passages or in the substance of the brain. Thus, a hæmorrhage from the lungs or a profuse nosebleed is not uncommon, as the result of an extra effort, a violent paroxysm of coughing or vomiting or a fit of passion, in persons supposing themselves to be in perfect health. These accidents, like an attack of gout in the great-toe joint, or an attack of acute indigestion, are merely reminders that something is wrong. Unless these signals of approaching danger are heeded, accidents of a more serious nature are sure to follow, or the slow process of arterial change described above is finally developed. The most serious accident which can arise from this sudden overaction of the heart is the rupture of a bloodvessel in the brain, the result being an apoplectic stroke, with its accompanying paralysis of one side of the body, or death from pressure of the escaped blood on the brain-cells in the neighborhood of the rupture. It will be seen, therefore, that apoplexy and one of the forms of paralysis, so dreaded by the laity, are the direct results of heart trouble; for the heart under such circumstances is troubled in its efforts to overcome obstacles in the circulatory current. These obstacles are generally the result of indiscretions, such as the habitual use of wine or excess in the eating of food highly charged with nitrogen, as beef, mutton, venison; or of indiscretions of other kinds, which lead to the same result.

The other stage referred to, is where the arterial changes have actually become established, but are progressive. With others the arteries supplying the heart-walls are involved. As was before stated, these changes interfere with the nutrition of the heart, and the heart is permanently weakened. During certain illnesses, particularly pneumonia, and pleurisy with exudation, the heart has extra work to do in overcoming obstacles the result of inflammatory processes and pressure, and being itself further weakened by the high fever and the diseased state of the blood from which it derives its nourishment, it gives out, and the patient dies of heart-failure, and not of the acute, the accidental disease. Another danger in these cases of weakened heart is that when still further weakened by disease, loss of blood or prolonged fatigue, clots are apt to form in the cavities of the organ and to be carried with the blood-current through the arteries until they finally become lodged at a point too small for them to pass. The supply of blood is cut off from the tissues nourished by the occluded vessels. If it be a vessel in the brain, a condition similar to the results of pressure from hæmorrhage follows, with poorer chances of recovery, the result frequently being sudden death.

Disease of the aortic valve—or the valve which lies at the root of the aorta and by its closure prevents the return of blood from that vessel into the left ventricle from which it has its origin—which is common as the result of extension of the atheromatous disease process from the aortic walls—always acts as an obstruction to the blood-current and requires a careful, guarded life.

Space will not allow further consideration of the various forms of heart disease, and, as those forms resulting from these arterial changes are the most common in middle and advanced life, and are the ones which can be avoided by a discreet life, I will briefly consider the mistakes and indiscretions which ultimately give rise to them, and the errors which so often result in sudden death.

These forms of heart disease are more common among the well-to-do brain workers than among the middle classes and those who earn their livelihood by manual labor. It is exceedingly rare among the middle classes, for the reason that, in order to keep up a respectable show of appearances, they are obliged to forego certain habits of life and luxuries which tend to a lithæmic condition of the blood, the result of disturbed liver function. They are also, as is well known, a temperate class. With the laboring classes, the drinking of ardent spirits is common; but the daily physical work which they are obliged to perform is conducive to great activity on the part of the liver, and alcohol is readily consumed in their bodies; otherwise these diseases would be more common among them.

It is generally supposed that excessive brain work is the main factor in the wearing out of the heart, and that nervous prostration or neuræsthenia is at the bottom of the conditions of life which lead to these sudden deaths from heart disease among our great men. It is exceedingly rare that nervous prostration is mentioned in the newspapers as the cause of death. The following is the nearest approach to this diagnosis which has appeared of late:

"His unremitting labors since the beginning of the session, added to the great responsibility of his position, have served to exhaust his vitality and render him particularly susceptible to attacks of this nature."

But even this only takes in a short period of the victim's life. Would the healthy heart have entirely given out, even with this strain, were there not a factor dating back and covering a long period of years, which contributed largely to this fatal termination of a valuable life, and that factor lithæmia?

True, excessive taxation of the brain often has to do with the causes of these diseases, but a healthy brain in a healthy body will

stand an amount of work which is often truly surprising; and the body rarely becomes affected by any of the organic diseases from excessive brain work alone. Numerous examples will come to the mind of every reader where, even into good old age, men who have led strictly temperate lives, have preserved their mental faculties in all their activity to the very last, and have finally died with a quiet, painless, peaceful form of death. But still, mental overwork, long continued, will bring about the conditions of the digestive organs which result in arterial changes, which, as has been stated, cause the heart to fail long before it should.

The following, taken from a medical journal, is a case in point: "One of London's most successful physicians, a few months before his death, in conversation with a friend, said, 'You see me, a little over 40 years of age, in full practice; my rooms are full, and I am making several thousand pounds per annum; all this I have done by sheer perseverance, unceasing hard work and no holidays. I have fatal disease of the heart, the result of anxiety and hard work. I know I cannot live many months, and my parting advice to you is this: Never mind at what loss, take your six weeks' holiday. It may delay your success, but it will insure its development; otherwise you will find yourself at my age a prosperous practitioner, but a dying man.'" To what profession or business will this not apply? Only recently, a lifelong temperance man of 70 came under my care for troubles resulting from chronic disturbance of the function of the liver, requiring an operation. He put the question in all seriousness, "If I have this operation performed on Saturday night, can I not go to my business on the following Monday morning?" adding, "For thirty years I have never been absent from my business a single day." The operation necessitated his remaining at home for two weeks. His worry was evident. He seemed to believe that his business would come to a standstill if he could not give it his personal attention. At the end of the two weeks he appeared quite surprised that his son, a man of 35, who had grown up with the business, had managed it about as well as if he himself had been at the helm. Fortunately, one of these two weeks was that of the "blizzard." The son had risen in the estimation of the father. It would certainly have been better for the father, for the son, and, perhaps, for the business as well, if these two weeks of holiday had occurred semi-annually for the past twenty years. It would be good policy for all of our business men, instead of tiring themselves out to give the young men a chance, and rest for a period from their labors. It is only necessary for a prominent business man to retire or die, and a young one will shortly spring up who will handle the reins with equal skill and success.

This steady, untiring labor is one of the causes of the wearing out of the heart; but this pulsating organ will last a long time if, added to this, there are or have been no grievous indiscretions in life.

It is claimed by some pathologists that derangement of the nervous system is the direct cause of organic disease of the heart. But this is far from being proved, and is doubted by the best authorities. Certain it is that when these affections exist in such subjects, it is found that the heart is not alone involved; and it is more than presumable that its diseased condition is secondary to, or a complication of, disease of other organs, aside from the nervous system.

Throughout this paper, the phrase "functional disease of the liver" has been repeatedly used; and to this condition, long continued, has been attributed the changes in the walls of the vessels which ultimately lead to organic disease of the heart and heart-failure. It will be well to briefly explain what is meant by this condition. This great glandular furnace and chemical laboratory, the liver, is really chief of the organs concerned in the digestion and assimilation of food. In perfect health, in youth and early manhood, it can be taxed considerably without serious disturbance of its chemical functions; but if for a length of time, even in the healthiest, it is overtaxed, it rebels and refuses to do its work. One of its principal functions is the transformation of excess of nitrogenous waste into the highly soluble excrementitious substance known as urea. This excrement is eliminated from the blood, with which it becomes combined, mainly by means of the kidneys. In certain derangements of the liver the nitrogenous waste is not converted into urea, but into uric acid, a comparatively insoluble and toxic substance which is with great difficulty eliminated. Its accumulation in the blood gives rise to the condition known as the "gouty diathesis," or lithæmia, and from this condition, it is generally conceded, result the arterial and capillary changes which are ultimately instrumental in producing certain forms of organic disease of the heart, kidneys, liver and nervous system. The writer unhesitatingly asserts that the forms of heart disease which kill so suddenly, and which do not result from an endocarditis or the presence of a specific poison in the blood, in nearly every instance arise directly from the pathological condition known as lithæmia.

Conceding, then, that liver disturbance is the primary cause of the premature wearing out of the heart, it is proper to ask: What gives rise in an otherwise healthy man or woman to this disturbed function? The answer in brief is: Indiscretions in living on the part of the patient or his ancestors. In what does this indiscretion consist? What mode of life will prevent these diseases? When they do exist, how shall a

life be regulated so as to avoid sudden death, or the rapid failure of that most vital of all the organs, the heart?

It would carry me too far were I to attempt to give to these questions answers that should be perfectly satisfactory to the inquiring scientific mind. The answers given, however, are founded upon careful study and observation, and supported by the opinions of the best pathologists in this line, on our own and the other side of the water.

Chief among the indiscretions referred to is the habitual though moderate use of drinks containing alcohol. With but few exceptions, the exhilarating, the damaging ingredient of all of the so-called stimulating drinks is alcohol. It matters not whether they are in the form of spirituous liquors, cordials, still wines of high or low grades, the most delicate champagnes, ales or beers. Independent of the effect of alcohol in disturbing the function of the liver, its presence in the blood, as well as actual contact with the delicate structures of which the body is composed, does injury which aids in the production of the changes which finally result in the wearing out of the heart.

Second in importance of these indiscretions is the excessive use of meat as an article of diet, and the excessive use of other kinds of food

Third.—Sedentary habits, with a lack of a proper amount of physical exercise in the open air and lack of healthful mental exercise.

Fourth.—Mental strain, too close attention to business, accompanied as it generally is by a lack of a proper amount of diversion and amusement; irregularity in eating, which generally results in dyspepsia and loss of appetite, and too little sleep, which finally results in insomnia or inability to sleep.

Fifth.—The habitual and indiscriminate use of drugs and patent medicines.

In a very large majority of the cases of weakened or diseased heart there have been two or more of the above-mentioned factors concerned in their development.

Added to these are certain unmentionable indiscretions which, by their direct action on nerve-centres, disturb the functions of all of the organs of the body, and finally result in premature wearing out of the heart as a part of a general process. Many of our cases of supposed organic disease of the heart in young persons, really cases of *irritable* heart, purely nervous affections, are attributable to these indiscretions, which may finally result in organic disease of this organ.

The answer to the question, What mode of life will prevent these diseases? is simple enough. A discreet life, temperance in all things, and particularly the avoidance of the above-mentioned indiscretions, especially the habitual use, even in moderation, of stimulating drinks and the ingestion of too much meat.

Finally, when these changes are known to exist, how shall a life be regulated to avoid sudden death or the rapid failure of the heart?

In the *Medical Record* of April 14th is found such a complete and satisfactory answer to this question, and it is so in accordance with my own views and experience in practice, that it will be quoted in full:

"Dr. George Harley ends his lectures on the effects of moderate drinking upon the human constitution with the following conclusions: '1. That alcohol, when indulged in even well within the limits of temperance, has a most prejudicial effect on heart disease. 2. That mental excitement is a cause of rupture of atheromatous bloodvessels. 3. That sudden spurts of muscular exertion act most deleteriously on all forms of organic cardiac affections. 4. That mere extra distension of a stomach by wind may suffice to fatally arrest a diseased heart's action. The knowledge of these facts has for some years led me to make it an invariable rule to impress upon all patients laboring under diseases of the circulatory system, who desire to minimize the effects of their complaints and ward off as long as is possible the inevitably fatal termination, to pay strict attention to what I call the following three golden rules—(1) Take exercise without fatigue, (2) nutrition without stimulation, and (3) amusement without excitement.' "

In closing this article, which has already outstepped the bounds of its intended limits, the author proposes to leave the sphere of his own profession and make a suggestion in political economy to the law-makers of our land, which, if favorably acted upon, would be the means, in many instances, of preventing the wearing out of the American heart, lungs, liver and kidneys, and of saving to the nation many valuable lives—lives that cannot well be spared. For the innovation he asks pardon of the lawyers and statesmen.

The suggestion is this: That a corps of expert medical examiners be appointed by each State, whose duties shall consist in the making of a thorough and scientific physical examination of every adult citizen at least once a year, and that the result of that examination be given in writing to each person examined—the expense of such examinations to be borne by the State—the examiners to be salaried officers, who shall not be permitted to engage in private practice, and that such examination shall be compulsory.

By this method, and this only, could men active in business or profession be kept informed as to the actual state of their health. Few, till reminded by symptoms of which they are conscious, trouble themselves as to their physical conditions. The time for medical skill to be of service is often before the evidences of disease have been made manifest to the patient; and indiscretions are often indulged in which

would be avoided did he know that by such indulgences health or life was endangered. Our life insurance companies and our national banks are obliged by law to submit sworn statements annually regarding their financial condition. Paid examiners, experts, are provided by the Government, whose duties consist in carefully scrutinizing the books of these institutions, to see if their financial statements are correct. Is money of more value than life? Had the late Chief Justice known that his heart was weakened, probably from the very conditions mentioned above, would he have insisted on attending court and participating in an important and exciting decision, while in a feeble state of health, the result of a cold? Would a late former commander-in-chief of our armies have risked his life by an unnecessary and sudden muscular spurt, had he known that his heart was unequal to such an effort, and that death would result from it? The very recent sudden death of Matthew Arnold was the immediate result of a violent and unnecessary muscular exertion.

If it be argued that the law would be difficult to enforce, the answer may be given that valuable citizens are law-abiding, and that few whose lives were worth the saving to the State or nation would violate the law by neglecting its provisions.

THE EFFECTS OF TOBACCO ON THE HEART.

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Medical opinions concerning the effects of tobacco on the heart are by no means definite or uniform, if the various views of writers on the subject be compared. On the one hand, the belief is staunchly held that hypertrophy of the heart is frequently and directly produced by the habitual use of the weed in its various forms. On the other hand, the assertion is made with equal positiveness that no organic heart lesion can be definitely laid to the blame of tobacco. Investigation into the possible effects of tobacco on the heart should, logically, embrace:

First.—An inquiry into the drug properties of tobacco and its active principles, *i.e.*, the power of tobacco to produce toxic effects upon the heart.

Second.—If the plant shows toxic properties, and they are manifested upon the heart, the nature of that action, *i.e.*, whether sympathetic, specific, or organic or inorganic.

Third.—The signs and symptoms by which we can definitely recognize and systematically classify the tobacco heart-disease or diseases.

And, as a natural corollary, from a medical standpoint:

Fourth.—The measures for the prevention, amelioration or cure of the disease or diseases.

That tobacco does affect the heart is theoretically certain if the various investigations into the nature of the plant are even approximately correct. For scientific purposes lay diatribes against the tobacco habit are absolutely valueless, inasmuch as isolated instances are cited as a text for sermonizing, and no effort is made to prove beyond cavil that cited instances of poisoning are unquestionably due to tobacco. Dr. Benjamin Ward Richardson, while studying the effects of tobacco upon the general system, found that there existed in tobacco smoke the following constituents: *Water*, in a state of vapor; free *carbon*, diffused in very minute particles, or soot; some *ammonias* (in a state of vapor), giving to the smoke an alkaline reaction; *carbonic acid* and *carbonic oxide*, each in a state of gas, and a vapor easily condensible into an oily-like substance, crude *nicotine*. It will be seen that tobacco smoke is a complex substance. The fluid alkaloidal body, nicotine, further yielded a volatile empyreumatic substance, which contained an *ammonia* and a dark, resinous, *bitter extract*.

The products of the combustion of tobacco, however, have been separated into still more refined divisions. Eulenberg and Vohl passed the smoke of tobacco through a strong solution of potassa, and afterwards through a solution of dilute sulphuric acid.

The solution of potassa separated carbonic, acetic, formic, butyric, valeric and other acids, including even hydrocyanic, together with creosote and some hydrocarbons.

"The acid solution fixed ammonia, and a series of oily bases resulted belonging to those homologues of aniline which Dr. T. Anderson first discovered in coal tar. These bases run parallel with aniline, and, under the action of iodide of ethyl, yield ammonium compounds. They are composed of the elements of carbon, hydrogen and nitrogen, and they differ in physical, and, probably, in physiological qualities, according to their atomic weights. The lightest is pyridine, composed chemically of C_5H_5N; the heaviest is viridine, $C_{12}H_{19}N$; and intermediate are picoline, C_7H_7N; lutidine, C_7H_9N; collodine, $C_8H_{11}N$; parvoline, $C_9H_{13}N$; coridine, $C_{10}H_{15}N$; and rubidine, $C_{11}H_{17}N$. Pyridine was found to be most abundant in smoke from tobacco, and picoline, lutidine and collodine in smoke from the cigar." However, in everyday smoking, all these products are not formed and inhaled, but the carbon, the ammonia, the carbonic acid and oxide and the nicotine are produced. The carbonic acid and the nicotine are the agents that most affect the heart.

These investigations prove that tobacco has toxic power. The ques-

tion naturally arises, if toxic, and it affects the heart, through what physiological system are its effects produced? The intensity of the symptoms developed by a first smoke disprove the popular idea that tobacco is a narcotic, like opium. Primarily its action seems to be as an irritant to the motor nervous system, and certainly "not as a narcotic upon the sensational." In addition to the general phenomena produced by a toxic first smoke, the condition of the heart of man, reasoning from the analogy of experiments on animals, ought to closely resemble Richardson's description: "The heart, overburdened with blood, and having little power left for its forcing action, is scarcely contracting, but is feebly trembling, as if, like a conscious thing, it knew equally its own responsibility and its own weakness. It is not a beating, it is a fluttering heart; its mechanism is perfect, but each fibre of it, to its minutest part, is impregnated with a substance which holds it in bondage and will not let it go."

If such are the acute toxic effects of tobacco upon the heart, what are the pathological conditions, disorders and symptoms produced by the abuse of it, and by working in it for a considerable period of time? In a progressive study of the subject, I accepted as a fact the chemical proof of tobacco's toxic power, the probable truth of the asserted condition of the heart in animals when first under the weed's influence, and the reasonable inference therefrom of a similar cardiac condition in man; but I regarded it as essential that investigation from a clinical standpoint also should positively demonstrate that tobacco produced cardiac effects. With the object of attempting such a demonstration, I began, among the employees of tobacco factories, a series of examinations. The table opposite shows the results obtained from the careful examination of thirty-one hearts:

All the subjects examined were males. The oldest was 32 years of age; the youngest, 17.

The longest period of time employed working in tobacco was 24 years; the shortest, 6 months; one worked 22 years; eight, over 12; twenty-five, 5 years or over.

Thirty-one smoked, and of this number fourteen smoked only, and seventeen both chewed and smoked.

The longest period of use of tobacco was 24 years; the shortest, 3; one used the weed 15 years; one, 16; one, 18; one, 19; one, 20; one, 21; and nineteen, over 10 years.

The use of the weed was begun in one instance at 1 year of age; one at 5; two at 7; one at 8; one at 10; and the remainder, with two exceptions, formed the habit at or about the period of puberty.

The character of the pulse was irregular in twenty; intermittent in

			Time employed working in Tobacco.	Use of Tobacco.		Length of time Tobacco was used.	Pulse Characters.					Pulse Rate.		Character of Impulse.			Palpitation.	Organic Disease Present.
							Irregular.	Intermittent.	Weak.	Strong.	Normal.	Standing.	Sitting.	Diminished.	Increased.	Normal.		
No.	Sex.	Age.	Years.	Chewing.	Smoking.	Years.												
*1	M.	25	24	C.	S.	24				S.		56	68		I.		Yes.	Hypertrophy.
2	M.	29	6		S.	16	I.	I.	W.			136	138	D.			Yes.	
3	M.	23	7		S.	3	I.					76	60			N.	No.	
4	M.	19	6	C.	S.	8	I.	I.		S.		84	80		I.		No.	
5	M.	25	14	C.	S.	20					N.	84	84			N.	No.	
6	M.	25	15	C.	S.	11			W.			80	72	D.			No.	
7	M.	25	12		S.	12	I.			S.		100	80		I.		No.	Hypertrophy.
8	M.	32	22		S.	7					N.	68	68		I.		No.	Aortic stenosis and Hypertrophy.
9	M.	17	7	C.	S.	9	I.					100	72			N.	No.	
10	M.	23	6	C.	S.	10	I.					100	84		I.		No.	Hypertrophy.
11	M.	18	5	C.	S.	8	I.					80	68		I.		No.	Hypertrophy.
12	M.	19	7	C.	S.	9	I.	I.	W.			92	80	D.			No.	
13	M.	22	7	C.	S.	12	I.	I.	W.			84	84	D.			No.	
14	M.	18	7	C.	S.	11	I.					72	52			N.	No.	
15	M.	17	5	C.	S.	10					N.	84	63			N.	No.	
16	M.	30	8		S.	20	I.	I.				100	76	D.			No.	
17	M.	22	3	C.	S.	20					N.	72	54			N.	No.	
18	M.	22	7	C.	S.	14	I.		W.			88	76	D.			No.	
19	M.	28	14	C.	S.	21					N.	72	60			N.	No.	
20	M.	22	10		S.	8	I.		W.			104	96	D.			No.	
21	M.	32	18		S.	19				S.		68	68		I.		No.	
22	M.	23	2½		S.	7	I.	I.		S.		88	64		I.		Yes.	
23	M.	21	5	C.	S.	3	I.		W.			112	106	D.			Yes.	Hypertrophy.
24	M.	22	6m		S.	9	I.					80	72			N.	No.	
25	M.	21	5		S.	4	I.	I.				96	66	D.			No.	Hypertrophy.
26	M.	23	7		S.	11	I.		W.			72	66		I.		Yes.	Hypertrophy and Aortic stenosis
27	M.	21	3		S.	11	I.					72	68			N.	No.	
28	M.	26	10	C.	S.	18	I.					92	80			N.	No.	
29	M.	23	9	C.	S.	12			W.			100	84	D.			No.	
30	M.	28	9	C.	S.	13	I.	I.	W.			72	88	D.			No.	
31	M.	29	15		S.	15						64	56	D.			No.	

seven; weak in eleven; strong in five (strong in only two cases of hypertrophy); both irregular and intermittent in seven; irregular, intermittent and weak in three; irregular and weak in three; simply weak in two; normal in twelve.

The highest pulse-rate, standing, was 136; sitting, 138. The lowest pulse-rate, standing, was 56; sitting, 56. Eight had a pulse-rate of over 100 when standing; two over 100 while sitting. Twenty-two

* This patient was born and reared in a tobacco factory.

had a pulse of over 72 while standing; fourteen over 72 while sitting. Three had pulses of less than 70 standing. Three had pulses of the same rate standing as sitting. Two had pulses faster while sitting than standing (one a case of aortic stenosis). The pulse-rate was below 70 both standing and sitting in four cases. In one case of enormous hypertrophy the pulse was 56 standing and 68 sitting. In three the pulse was stronger when sitting than when standing.

The impulse was diminished in twelve; increased in nine (increased in two without hypertrophy); the impulse was (nearly) normal in ten.

Five had experienced attacks of palpitation, three of whom suffered from hypertrophy. Only one had the palpitation directly following the use of tobacco.

Eight cases of hypertrophy were discovered—six simple and two associated with aortic stenosis. It would be manifestly unfair to infer, simply because the subjects of hypertrophy were workers in and users of tobacco, that the enlargement of the heart was due to the plant. All the remaining causative factors of cardiac overgrowth could not be excluded, and hence the solution of the question of origin remains *sub judice*. That the tobacco habit can cause the so-called irritable heart I do not doubt; but that tobacco sets up a particular and specific hypertrophic enlargement seems conjectural. It seems only fair to say that the abuse of the plant may lead to an irritable heart, and that an irritable heart may become hypertrophied, but that, if such enlargement does take place as a consequence of the toxic effects of tobacco, it is not a specially peculiar muscular increase, and is probably undistinguishable from other forms. (The existence of the traditional tobacco hypertrophy I cannot but regard as unproved.) In all the cases of hypertrophy I elicited a history of considerable muscular exertion and rough out-door sports. One was a baseball pitcher. All the hypertrophies were symptomless. In but two could I elicit histories of palpitation, and even this information was secured by dint of close and persistent questioning. The men did not know they had a heart so far as symptoms were concerned. It is quite possible that the sedative effect and the cardiac muscular weakness induced by the habit kept the heart from manifesting its full strength. The effect of the tobacco had probably been to diminish the force of the heart's action and induce vessel relaxation. This symptomless character of the hypertrophy would apparently seem entitled to be considered pathognomonic of the effects of tobacco on the heart, and to be of diagnostic value. However, this symptom is not met with alone in users of the weed. I have seen other symptomless cases

of simple hypertrophy where there existed no tobacco habit or history of it.

Neither of the cases of aortic stenosis knew he had heart disease, and but one reported having experienced palpitation. Neither had suffered from inflammatory rheumatism, but one had passed through the exanthemata. In one the pulse-rate was practically normal, 66 sitting, 72 standing, although in character the pulse was irregular and weak. In the other, the pulse was the same when standing as when sitting. (Equality of the standing and sitting pulse appeared in one other case.) It would be unwise to consider the aortic stenosis due to tobacco simply because of the absence of a history of inflammatory rheumatism. I have seen a number of cases of idiopathic valvular disease. The fact of their symptomless existence is of no special significance, inasmuch as compensation was fairly perfect. It is the everyday experience of physicians that valvular lesions are discovered by systematic examinations, the existence of which had never been suspected by the patients.

In twenty cases there existed a considerable abnormal disparity between the pulse when sitting and when standing, viz.: 56 standing, 68 sitting (hypertrophy); 76 standing, 60 sitting; 100 standing, 80 sitting; 100 standing, 72 sitting; 100 standing, 84 sitting; 72 standing, 52 sitting; 84 standing, 68 sitting; 100 standing, 76 sitting; 72 standing, 54 sitting.

A peculiarity was observed in thirty cases. The power of the impulse seemed to be less than the apparent muscular strength of the heart; and the first sound lacked a proper amount of booming quality. This character is more readily appreciated than explained. I have noticed this peculiarity in other tobacco-users than those whose examinations are tabulated. This alteration was also noticeable in the cases of hypertrophy; that is, the impulse was less strong and booming than would naturally be anticipated from the amount of enlargement. It is not simply the lessened strength due to increased rapidity of action; it is something more than that. The sign appears most explicable by a mechanical illustration: It seems as if a systole capable of exerting a 65-pound force was exercising only 40-pound power, and, associated with this lack of power, even while the heart is acting rapidly, the idea of sluggish movement is conveyed to the ear. The blow of the systole is not well delivered.

Summarizing the apparent effects of tobacco on the heart, we find that the pulse was increased in rapidity (twenty-two cases), rendered irregular (twenty), and occasionally intermittent (seven); that no special symptoms accompanied the cardiac changes; that the normal

disparity between the pulse when standing and when sitting seemed to be abnormally increased; that the impulse seemed to be peculiarily diminished in force, and that the first sound appeared to lack sufficient booming quality for the apparent amount of muscle present.

The toxicity of tobacco ascertained, and the power of the plant to produce cardiac derangement reasonably assured, it is next necessary to inquire into the diagnostic data.

The diagnosis of the tobacco-heart is by no means easy. As a rule, an irritable heart is discovered, and the dependency of cardiac signs and symptoms upon the use of tobacco is positively ascertained only by the amelioration following the cessation of the habit. A history of the habit, and of palpitation following speedily upon indulgence, is of signal service. The difficulty in diagnosis arises from the attempt to make out a specific disease entitled to a separate and distinctive place among cardiac maladies. The diagnosis of an irritable heart is, in itself, very easy. All that is needed is rapidity of action, irregularity of rhythm and occasional palpitation. If the tobacco-heart, and not an irritable heart from the abuse of tobacco, is to be diagnosed, I regard as of especial value the peculiarity noted in the impulse and first sound—a peculiarity, by the way, which I had observed in tobacco-users' hearts before I made any attempt at this special study. Until the investigations reported in this paper, I had never looked for nor noted abnormal disparities between the pulse when sitting and when standing. Hence the value of the observation from a diagnostic standpoint remains to be established or disproved by clinical experience. If the examined heart be hypertrophied, and that hypertrophy gives rise to symptoms, insignificant when compared with the amount of enlargement, I believe that the unusual sedation is of value, not in determining that the hypertrophy was caused by tobacco, but that the heart was under the weed's influence.

A few general observations concerning the cases investigated are:

That all those examined began their work in and use of tobacco in adolescence or childhood, a period most likely to develop the ill effects of occupation and of bad habits.

That the chronic toxic effects of tobacco on the heart do not closely resemble the acute effects in animals.

That tobacco increases the action of the heart and diminishes its force, and that the force is diminished proportionately more than the diminution that physiologically follows increased action.

The irregularity of rhythm is nearly as characteristic as rapidity.

That intermittency is only of occasional occurrence.

That palpitation is not nearly so frequently caused by tobacco as is professionally and popularly believed.

That there is no indisputable evidence that tobacco causes organic heart disease *per se*.

That, theoretically, tobacco cannot cause hypertrophy, because, while increasing the rapidity, the muscular power of the heart is diminished.

That, practically, the existence of the traditional tobacco hypertrophy is not proved, all other causative factors not having been excluded.

That there is a strong presumptive evidence that tobacco can cause functional disorder of the heart.

That tobacco is one causative factor in irritable heart.

That the tobacco-heart is an irritable heart, *plus* probably a peculiar alteration in the impulse and first sound, a disproportionate disparity between the pulse when sitting and when standing, a history of the habit, and *minus* other causative factors.

That it is questionable, in the present state of our knowledge, whether it would not be a needless refinement to consider the so-called tobacco-heart as entitled to a distinct classification.

That the cardiac disturbances caused by tobacco can exist without symptoms, and that, therefore, it is not fair to assume that because no symptoms exist no disorder is present.

That the absence of subjective circulatory symptoms is not characteristic alone of the influence of tobacco on the heart.

That the exaggeration of the normal disparity of the pulse when standing and when sitting is worthy of further investigation.

That the peculiarity in the impulse and first sound promises well in a diagnostic point of view.

That conclusions drawn from the investigation of thirty-one cases are simply suggestions of possibilities.

That thirty-one sedentary subjects, not working in tobacco, and not users of the weed, should be examined, and the result tabulated in parallel columns with those already investigated, before conclusions should be assumed to possess positive value.

Concerning the therapeutics of the irritable heart, we shall have nothing to say at present.—*Read before the Homœopathic Medical Society of the State of Pennsylvania*, 1888.

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