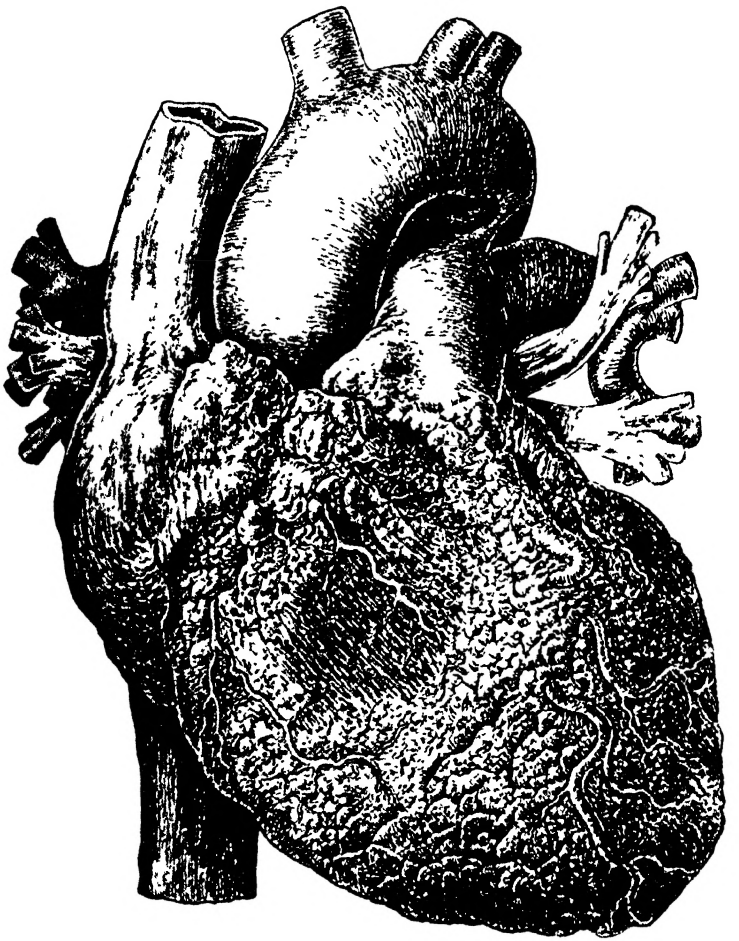

THAT HEART OF YOURS
Actual Life Size, Average Adult (Author's Graduation Thesis)

THAT HEART OF YOURS

BY

S. CALVIN SMITH, M.D., Sc.D.

AUTHOR OF

"HEART AFFECTIONS: THEIR RECOGNITION AND TREATMENT"

"HEART RECORDS: THEIR INTERPRETATION AND PREPARATION"

"HOW IS YOUR HEART?" (NEW YORK AND LONDON), ETC.

ILLUSTRATED

PHILADELPHIA LONDON MONTREAL

J. B. LIPPINCOTT COMPANY

Printed in the United States of America

INSCRIBED TO THE MEMORY OF

MY FATHER, UNCLE AND BROTHER

GEORGE W. SMITH, M.D.
JAMES M. SMITH, M.D.
S. MACCUEN SMITH, M.D.

Who devoted their lives to the
Art of Healing

FELIX QUI POTUIT RERUM COGNOSCERE CAUSAS

—*Vergil*

(Happy the man who has been able to learn the causes of things)

FOREWORD

When a person first learns that his heart is affected he is either skeptical or dismayed.

Whether the mental reaction be one of doubt or apprehension, that person should seek all available knowledge on the heart that will clarify the opinion expressed.

The purpose of this volume is to supplement and amplify the information which physicians give to a heart patient when time permits and when the person is in a receptive mood. Where an idea is repeated in these pages, it is purposely done in the hope that restatement may clarify and emphasize truths that are vital.

This book derives its inspiration from the countless questions that patients have asked, each with this dominant thought: "Now that I have heart trouble, what must I do—how shall I carry on, in order that I may continue to live happily, contentedly and to some degree efficiently?"

The newer understanding of heart affections, which began with the massing of men for the World War, has in the years intervening attained to such proportions as to necessitate a new specialty in Medicine called Cardiology. With the advance of modern methods of study, the once prevalent dread, horror and hopelessness of heart impairment have beaten a retreat and given place to encouragement, confidence and optimism for every heart afflicted.

Although the conquest of heart trouble has been made by Modern Medicine, the conquest of troubled hearts rests largely with the individual. This book shows the ways of helping *That Heart of Yours.*

S. C. S.

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CHAPTER I

THE HEART IS MORE SINNED AGAINST THAN SINNING

Persons who are concerned over their hearts first consult a physician for two principal reasons. These reasons are based upon a profound mental impression or upon an unnatural physical sensation, either of which causes them to suspect that the heart is affected.

The mental states of anxiety, apprehension, psychic shock and fear are responsible for probably forty per cent. of the new patients who consult physicians specializing in heart conditions. These persons do not have any glaring physical defects, neither do they present any outstanding evidence of heart impairment. Such an individual is simply heart conscious, for mental stimuli have made the heart a barometer of the emotions.

1. **Anxiety**, for example, motivates a heart consultation when doubts arise as to a possible inability to carry through with a proposed program. Thus aspirants to public office, vocalists who are contemplating concert tours, travelers who are arranging journeys to distant lands, all may conceive anxieties as to the heart's continued integrity under the new conditions.

2. **Apprehension** of heart impairment is illustrated by the concern which parents exhibit in the unexpected prostrations of children at school or at play. Apprehension also activates the husband who requires that special heart

studies be made of an expectant mother. Apprehension for the future of a family impels a father to the consultation room, in order to make reasonably certain that his heart will carry on while he builds for the future of his dependents.

3. **Psychic shock** as a compelling motive for heart examination develops among those who witness the sudden collapse of a hurrying man in a railway station and among the members of a country club when a golfer unexpectedly expires. Psychic shock also dominates the actions of a man who demands a heart investigation for the reason that he has been startled by discovering that at his age several ancestors were already gone with heart defects.

4. **Fear** of heart impairment is the gripping mental reaction which ensues under such dramatic circumstances as the sudden collapse of a host at dinner, the shocking demise of a parent at a wedding or the failure of a swimming companion to reappear.

There are many causes for sudden and unexpected deaths; but always the heart must bear the brunt of accusation and witnesses of the tragedies have shocked hearts in consequence.

Passing now from a consideration of what may be called purely psychic heart consciousness, attention may next be directed to instances of heart awareness that are punctuated by an occasional physical sensation or finding that is recognized generally as indicating heart trouble. Persons thus affected furnish probably another forty per cent. of a heart consultant's clientele, leaving approximately only twenty per cent. of actually damaged hearts—one

impaired out of five harassed—to cross the threshold of a specialized heart practice.

The heart is far more sinned against than sinning.

Genuine heart impairment is identified by a grouping of those sensations which the patient notices, plus signs which the physician elicits. Several such findings, that would include high blood pressure readings, an intermittent pulse, periods of rapid heart and chest pain, would indicate the presence of heart trouble when considered as a group. But when such findings occur as isolated instances and are not associated with other confirmatory signs, they may have been induced by conditions elsewhere in the body and not necessarily be of heart significance.

For example, during an insurance examination, the applicant may have had a blood pressure reading which was a little higher than ordinary and, as high blood pressures sometimes are associated with heart conditions, the heart is immediately brought into question. As a matter of fact, the pressure may only have been temporarily high and due to some such simple circumstance as having been taken immediately after a meal, after a contention or argument or estimated when the mind and body were busily engaged in business pursuits. Unless more natural correct readings were obtained under more accustomed circumstances than these, it might be assumed that heart trouble was responsible for the elevated pressure readings.

As a second instance, a person might notice within the chest a sensation described as the heart turning over, or thumping, or dropping a beat, while reading the evening paper or shortly after retiring for the night. Such an incident very frequently alarms a person and creates the

impression of heart damage, when, as a matter of fact, the heart is organically sound. The organ has simply been protesting against some trivial circumstance, such as might arise from physical weariness or emotional strain that was incident to the day's activities. The person may have eaten when tired; have forced the intake of food when there was no appetite; or there may have been an intestinal disturbance, such as constipation. Indeed, even such an unsuspected source as prolonged reading by artificial light with resultant eye strain may be the cause of the heart occasionally skipping a beat.

As a third example of the heart being unjustly accused of inducing physical distress, can be cited the condition frequently referred to as rapid pounding of the heart (tachycardia). This heart hurry usually occurs in persons of the highly nervous type, who go through life riding emotional waves, sinking from their crest into the troughs of despond. Physically tired, mentally weary, emotionally unstable these temperamental unfortunates are often the victims of circumstances beyond their control, as in the unhappily married, or those living in an uncongenial environment, where friction continually buffs the emotions with resultant periods of heart hurry and chest oppression. Manifestly, it is the oppressive environment or maladjustment to daily life which causes the heart to protest, while the heart itself is inherently sound.

Pain in the chest and arms is another symptom in which the heart might be hastily accused on what would later prove to be insufficient evidence. A person who is not accustomed to strenuous exercise may have occasion to use inordinately the muscles of the upper body and should

these muscles shortly afterward ache and throb, a suspicion of heart impairment may arise in susceptible minds. That conclusion is as illogical as it would be to blame on the kidneys the backache and sore loins which follow unaccustomed horseback riding.

Another example of chest pain, the usual importance of which as a heart symptom cannot be overemphasized, but which nevertheless is not invariably of heart significance, occurred in a physician who was mentally miserable on account of a pain in the left chest and shoulder, which radiated down the left arm with persistent recurrence every morning on reaching his city office and every evening on arriving at his suburban home. Angina pectoris dominated his thoughts. Otherwise, the doctor was symptom free; he had no confirmatory signs; the pain was not precipitated by climbing stairs, by golfing nor by gardening. Inquiry elicited that he drove an open automobile very rapidly. He was advised to abandon the open car and drive a closed sedan. Upon making this change, the neuralgia of the left chest and shoulder, due to exposure and elevated position, promptly and completely disappeared.

These illustrations are only a few of the many incidents in daily life in which the heart is unjustly accused of causing conditions for which it is not at all responsible and blamed for symptoms in the production of which it has no part whatever.

Furthermore, scarcely a day passes that we do not find the heart acting as a barometer of the emotions, and it may protest most vigorously against sustained emotional alertness. An illustration of this is found in persons who are hard of hearing and who must literally strain every

nerve in a continual effort to appreciate and interpret sound by means of mechanical contrivances that are supposed to aid in hearing, thereby inducing tachycardia and high blood pressure readings; and heart vagaries also arise in persons with impaired vision, who constantly strain to see and interpret objects amid the mist around them.

It cannot be stated too emphatically at the outset of this book that heart protests are not heart disease. To be further borne in mind is this fundamental truth; the heart is far more sinned against than sinning. Rarely, if ever, is the heart primarily at fault. Almost without exception, some circumstance outside of the heart is responsible for the beginning of heart trouble. Bearing these basic truths in mind, we can evolve a constructive program for improved efficiency in any heart, be it simply protesting or actually deranged. Better heart health is attained by easing its load, by lightening its burdens, by the proper interweaving of rest and exercise and by correct daily living, as shown further on in this volume.

CHAPTER II

STRUCTURE AND FUNCTION OF THE HEART

A machine cannot be given intelligent care unless its operator knows something of its construction, its purposes and its workings. Mechanically considered, the human heart is a superb machine. To be intelligently operated one must know the fundamentals concerning heart structure and performance. So now we consider the structure and function, called the anatomy and physiology, of the heart.

THE HEART IN HEALTH

The normal heart is a very powerful muscular organ, located under the left front of the chest, extending laterally from the breast bone to the left nipple line and situated horizontally between the second and fifth ribs. Speaking rather broadly, the heart is about the size of its owner's fist,—whether the owner be a slender and delicate woman or a thick set robust man. Speaking accurately, the average measurement of normal hearts from many adults give the following figures; five inches long, three and one-half inches in breadth at the widest part and two and one-half inches thick, the average weight being ten ounces. The heart, which is shaped like a pear held with the narrow end down, is broad at its base at

the second rib, directed obliquely in the chest so that the apex is under a man's nipple at the level of the fifth rib.

DOUBLE FUNCTION OF THE HEART

The double duty and function of the heart is to pump fresh nourishing blood to every part of the body, and at the same time to pump to the lungs the used contaminated blood that it receives in exchange from bodily structures, so that the lungs may purify and oxygenate the fluid before it is again distributed as vital and invigorating nourishment to the bodily tissues.

THE CHAMBERS AND VESSELS OF THE HEART

Of course if the heart is to function as a pump, it must contain chambers that act as reservoirs to receive the blood, and other chambers directly beneath that act as pumps to propel the blood to the tissues. These four chambers, the walls of which are the heart muscle, must also connect with incoming and outgoing tubes, in order that the blood may circulate. The incoming tubes are called veins and they open into the reservoir chambers called auricles; the outgoing tubes are called arteries and their mouths open from the pumping chambers called ventricles.

THE RIGHT HEART AND THE LEFT HEART

The thought often occurs to a novice that with the same heart receiving both venous blood and oxygenated blood the fluids would be mixed and the good blood contaminated by the bad. The Supreme Architect took care of this point when the first heart model was constructed in

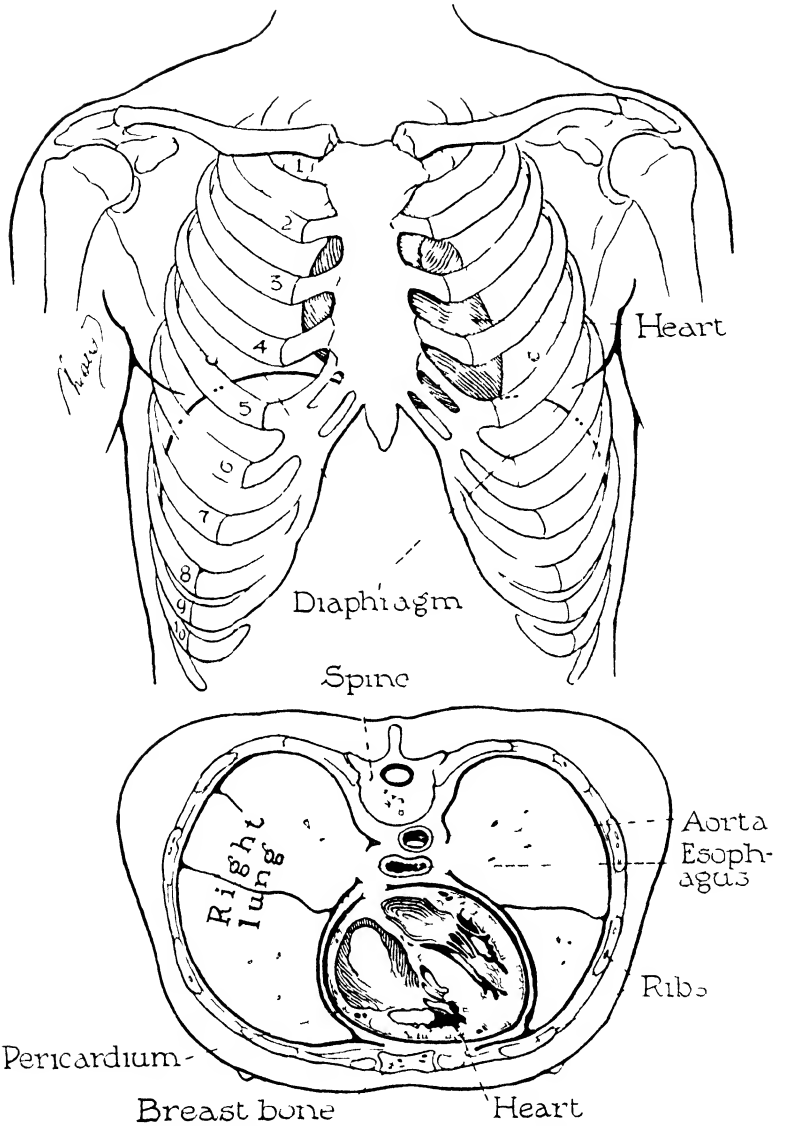

FIG. 1.—THE HEART WITHIN THE CHEST. The upper illustration an anterior view, shows the relation of the heart to the bony landmarks of the chest. The lower illustration is a sectional view looking downwards from above the nipple, and shows the heart's relation to adjacent structures within the chest.

the Garden of Eden. It was then ordained that the right side of the heart should receive and pump only used venous blood, while the left side of the heart should handle only the nourishing arterial blood. So while the upper chambers of the heart communicate with the lower, there is a solid impenetrable wall that completely separates the right heart from the left heart. It was a practical and conservative piece of construction—this centralization of receiving and distributing stations.

VALVES OF THE HEART

The openings into each of the two auricular reservoirs are guarded by one way valves. There is also a valve between the right auricle and right ventricle and another between the left auricle and left ventricle. Then there is an outgoing valve from the right ventricle and one from the left ventricle, which guard the ventricular pumps at their connections with the outgoing tubes. These valves are constructed from the lining membrane (endocardium) of the heart which is reduplicated in folds, in order that the valves may be sufficiently thick to stand the strain of back pressure to which they are subjected when the heart contracts. In the ox one of the heart valves is reinforced by a bit of bone.

THE GREATER CIRCULATION

In order to illustrate the heart in action, suppose we follow two ounces of blood from the instant it enters the heart until it is distributed throughout the body, back again to the identical starting point. The completed round trip requires a little over one minute—eighty seconds to

be exact. And the reason we selected two ounces of blood for this tour of the circulation is because that represents about the usual amount to be found in any given chamber at any one time, even when the body is under physical stress.

Incidentally, this average and limited capacity of the normal heart—two ounces—is a fundamental reason for our hearts working rapidly when we are putting forth extreme physical effort. The straining muscles demand more blood, and to supply that demand the heart cannot materially increase the volume for distribution, so it increases the speed of delivery. In other words, what the heart cannot make up in increased volume it makes up in increased speed, producing a rapid pulse (tachycardia).

THE HEART'S CONSTRAINT

When one realizes that the human body contains one pint of blood for every nine pounds of body weight, and that a one hundred and fifty pound man thus has within him about eight quarts of blood, we can see what a powerful resistance the heart must have to keep from overstretching its two ounce capacity under physical duress. Is it any wonder that the heart sometimes cannot withstand the continuous and repeated strain of physical exertion, enlarging as a result of perpetually exaggerated demand and thus creating that stretched and flabby structure called an athlete's heart?

But let us continue with our tour of the blood's circulation, which was discovered by the English physician, William Harvey, in 1628. The itinerary commences in the left auricular reservoir, which has just received from the

lungs a consignment of wholesome, oxygenated and highly vitalized blood. The left ventricle beneath is just recovering from its previous squeeze and as it expands, there is thus created an aspirating action which draws the blood from the left auricle through the mitral valve, the expansion of the left ventricle having drawn this valve open by pulling on little guy ropes (the chordae tendinae), which extend from the valve leaflets to the ventricular walls. The mitral is the largest and strongest of all heart valves, and in an adult man would open to the size of admitting the tips of three fingers. Thus the left ventricle is filled to full capacity. The mitral valve now closes, and the left ventricle is all set for the powerful shoot and squeeze that will propagate a pulse wave to the uttermost recesses of the body.

HEART VALVES AND MURMURS

Incidentally, if the mitral valve failed to close completely because a temporary heart enlargement kept the valve leaflets from closely approximating at their edges, there would be a whirling of blood through the orifice back into the auricle; the blood would make a localized and transitory sound as it swished back through the partially open valve and the doctors would call this sound a functional murmur. Again, should the valve leaflets have been distorted, warped or curled up on themselves by disease, the sound produced would be loud, harsh, permanent and transmitted over the chest. This is called an organic murmur. In these two ways most murmurs are produced at any of the four valves of the heart, whether

it be called a mitral, aortic, tricuspid or pulmonary valve murmur.

Now the left ventricle, the most muscularly powerful of all the heart chambers, majestically contracts, shooting the blood through the aortic valve, which opens and shuts as obediently to natural laws as did the mitral.

THE AORTIC CONDUIT

The aorta, the large main conduit leading from the heart, promptly describes a downward curve, which curve is called the arch of the aorta. Large branches are distributed on both sides of the neck (carotid arteries) to the head and face. The main conduit continues downward as the thoracic aorta, supplying the organs of the chest, then enters the abdomen, becoming the abdominal aorta, there giving off main branches to various organs, finally becoming so reduced from its original large calibration that it loses its identity and name at about the level of the navel where it divides into two smaller trunks that are sent to the muscles of the legs (femoral arteries) and feet.

DIVISIONS AND SUBDIVISIONS OF THE ARTERIAL TRUNK

The arteries continue to give off branches and grow smaller and smaller, until they finally eventuate in arterioles. These arterioles continue to subdivide, eventually terminating in very fine arborizations called capillaries. From the thin capillary wall, that is of infinite microscopic dimension, the nourishment and oxygen pass to the muscle fibers. The impure waste products of muscular activity

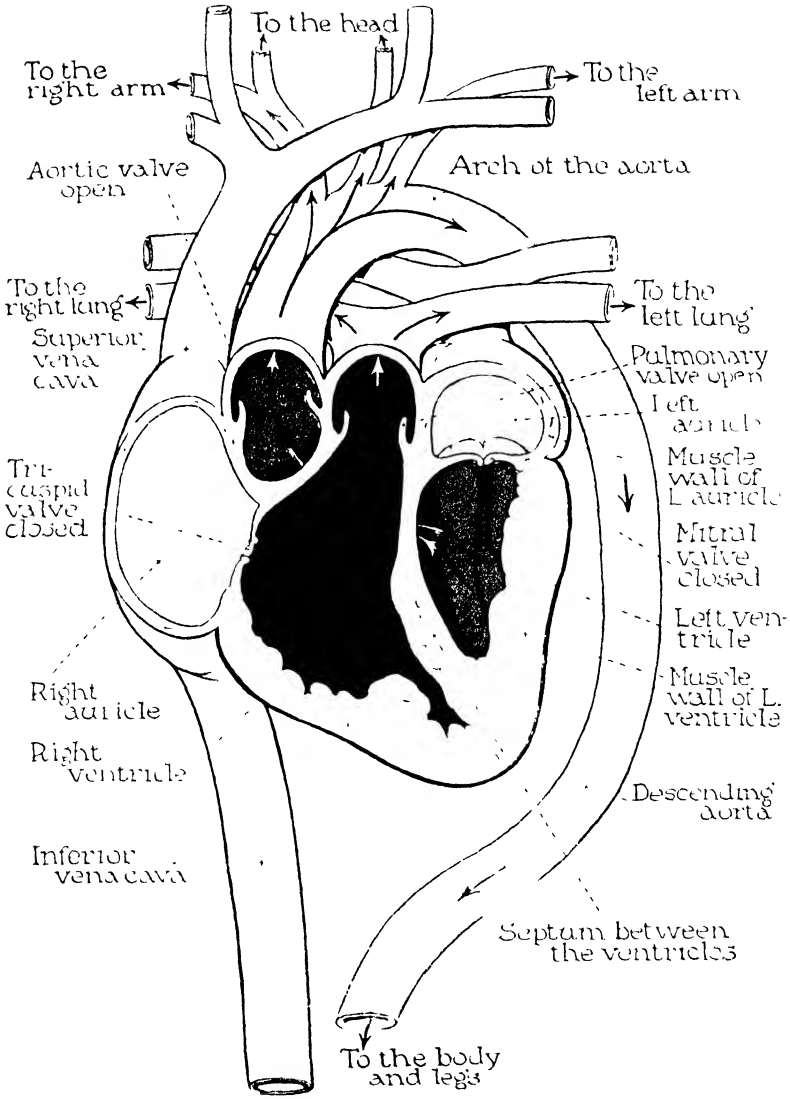

FIG. 2.—THE SYSTOLIC (SQUEEZING) PERIOD OF THE HEART. Showing the structures concerned in the propulsion of blood to the body and to the lungs.

are collected by infinitely small venules, and thus the vitiated blood returns to the heart by way of the veins.

HOW ARTERIES DIFFER FROM VEINS

Let us digress at this point, in our tour of the circulation, to explain the difference between arteries and veins.

Along side of all arteries (the outgoing tubes) run the veins (the incoming tubes). Incidentally, nerves also stretch along the same pathway, much as a town's water supply, sewerage pipes and electric wires might all be laid in the same underground channel.

Arteries distribute bright red nourishing blood, supplying the tissues with nutriment and oxygen. The veins carry back to the heart dark blue blood, loaded with waste products of muscular activity. Arteries pulsate, and it is necessary that they should, for thus they reinforce the heart beat and assist in further propelling the blood to distant parts. Veins are simply return tubes, through which the blood flows as a steady stream without pulsation.

VEINS HAVE VALVES

However, veins are ingeniously provided with valves at frequent intervals in their lengths, which prevent the column of blood from falling backwards on its way to the heart. When these valves are for any reason incompetent, as after an infection which inflames the vein (phlebitis), the veins thus deprived of valve support enlarge and may become tortuous or knotted (varicose veins).

PURIFICATION OF THE BLOOD

Let us continue with the return trip of vitiated venous blood to the heart. Enroute, the returning blood under-

goes purification by passing through those filtration plants called the kidneys, and is further purified by passing through that other large excretory gland, the liver, which has been called the body's burying ground for bacteria. Thus partially cleansed, that two ounces of blood with which we started from the left auricle finally reaches the opposite side of the heart, the right auricle, being delivered into the right auricular reservoir by the large venous trunk called the vena cava.

THE LESSER CIRCULATION

From the right auricle the venous blood now passes through the tricuspid valve into the right ventricle, which chamber then contracts, just as did its fellow of the opposite side and at the same instant of time. This contraction of the right ventricle sends the venous blood into the lungs.

The blood receives its final purification in the lungs by there giving off carbonic acid gas and receiving in exchange, from the air we breathe, the oxygen which is vital to all living tissue. Finally freshly purified, the blood, no longer blue and venous, is delivered to the left auricular reservoir, ready to be again distributed to distant parts.

Thus is completed that round trip of the circulation which began when the two ounces of blood sped away from the left auricle. It has taken a long time to describe the trip; but the blood accomplished the journey in eighty brief seconds without any stopovers enroute, for the blood moves continually and is never stagnant for even the briefest fraction of a second as long as life lasts.

REPLENISHMENT OF THE BLOOD

It is not enough that blood, which is to be recirculated, should be cleansed, purified and oxygenated. That blood must be refurnished with nutrition for the tissues and the blood's nutriment is supplied in the following manner.

Of the food we eat, that part of it which is acceptable for digestion is absorbed by a myriad of little mouths called villi which line the small intestines, and is carried as a substance called chyle, through the tiny lymphatic capillaries into the larger lymphatic ducts, which unload the chyle into a large vein. Thus the food we digest is utilized and becomes part of the blood stream.

HOW THE HEART PULSATES

Now we have seen how this powerful and ingenious contrivance, called the heart, performs its function of circulating nourishment and oxygen to each and every cell in the human body. But a circulation could not be maintained without an energizing force, so there yet remains to be answered this question: From what mysterious source does the heart derive its inherent power to contract?

The heart originates its contraction impulse from substances which it derives from the blood. Not from the blood that is contained within the chambers of the heart; but instead from the blood that circulates through the heart muscle itself. The heart's own individual blood supply reaches the muscle by way of the two coronary arteries, which arise from the aorta, close to the junction of that tube with the left ventricle. From its blood supply

the heart extracts sodium, calcium and potassium. It is believed that one of these three substances initiates the heart beat, another sustains it and a third terminates the contraction impulse.

CONDUCTING THE IMPULSE FOR CONTRACTION

The impulse thereby created, which originates at the top of the right auricle, is carried over specialized conduction tissue (conduction system) to both ventricles and there distributed by fine nerve fibers into the ventricular muscle.

Thus within that marvellous mechanical masterpiece called the heart there is an interchange of blood constituents that is translated into energy and the resultant impulse is conveyed over specialized neuromuscular tissue—much as electric energy is transmitted from a dynamo over wires,—to tiny muscle fibers in the ventricles, which impulse results in a simultaneous contraction of both lower chambers, producing a heart beat. This heart beat, propagated to the wrist or to any other available artery, constitutes the pulse. And so the rhythmical contraction of the normal heart continues from one beat to another for minutes, hours, days and months into the years that encompass a lifetime.

RATE OF THE HEART

The heart has both rate and rhythm. It is generally said that the average heart rate is seventy-two beats per minute; but this figure must have been deduced from the

pulse rates noted in a convalescent ward, where all of the adults were reclining in bed or in easy chairs. For the pulse rates of five thousand healthy young Americans in a World War training camp, studied an hour before breakfast, averaged ninety beats per minute. So a rate of from seventy to ninety should be considered normal, depending on whether a person is sedentary or active, delicate or robust, young or old. The pulse that repeatedly drops below sixty should be investigated; a rate that is persistently over one hundred also calls for a heart examination.

The rate is regulated principally by the vagus nerves and the sympathetic nerves. Vagus means wandering and this nerve that comes directly from the brain was probably so named because the early anatomists, while they could easily see at their dissections from whence it emerged at the brain, could have had no definite idea as to where it terminated, for branches of this nerve are distributed to the lungs, to the stomach and to the heart. Later-day anatomists call the vagus the pneumogastric (lung-stomach) nerve and still more recent investigations reveal that the vagus is the inhibitory nerve of the heart. When stimulated it slows the rate. When the vagus is depressed or for any reason temporarily abandons control, then the sympathetic or accelerator nerves dominate the rate of the heart and make it beat very rapidly.

NERVE CONTROL OF THE HEART

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horrible accident or by the announcement of dreadful news—the mind goes blank for a moment, the mental processes are stunned and the vagus (inhibitory) nerve that goes to the heart is temporarily out of control, thus allowing the sympathetic (accelerator) nerves to dominate the rate and the heart beats furiously fast. Or as another illustration: Some gastric disturbance or an acute lung infection descends upon a person, and this pneumogastric (inhibitory) nerve, with its fibers distributed to stomach, heart and lungs, may be depressed, and again the sympathetic (accelerator) nerves assume control and the heart rate is very rapid. Thus arise many of the innocent causes of heart hurry (tachycardia) which we all experience at times.

So much for the rate control of the healthy heart. It is governed largely by extrinsic (outside) nerves, although of course some heart defect may also influence the rate.

RHYTHM OF THE HEART

Rhythm means regularity. The rhythm of the heart is governed principally by a nerve mechanism located and distributed inside of the heart itself,—as already described under Conduction System on page 18. As the conduction system is intimately distributed in the tissue of the heart, it is clear that toxic invasion of the heart muscle is liable to induce disturbances of heart rhythm; hence rhythm variations may be a valuable indication of actual heart trouble. So at this point the following truism should be emphasized: **The rhythm of the heart is of more importance than the rate.**

RHYTHM VARIATIONS DURING ACUTE ILLNESS

Ordinarily, the rhythm of the heart proceeds with the clock-governed regularity of a swinging pendulum, propagating the pulse at anticipated intervals of time. There are six varieties of abnormal rhythm, varying from the relatively innocent "skipped beat" to the dramatic delirium of arrhythmia known as fibrillation.

During an acute illness various rhythms may be assumed. For example, in diphtheria the heart may adopt as many as five successive types of abnormal rhythm as one after another is impeded by the toxins of disease, much as a thoroughbred race horse will adopt such different paces as trotting, loping, cantering or running in a heroic effort to carry the rider to victory in a closely contested race.

A change in rhythm during an acute illness may be for the best interests of the circulation at the moment the heart adopts it, and may mean circulatory triumph, not always circulatory defeat. Just as fever is often an evidence of the body's strength to resist and hence an encouraging sign, so a change in rhythm may be a sign of the heart's adaptability to varying circulatory demands.

ADAPTABILITY OF THE HEART

The facility with which the heart can adapt itself to varying circumstances of health and disease is one of its most astonishing attributes. Even before we are born this marvellous adaptability to circulatory demands is manifest. While the future infant is developing in the mother's

womb, it does not use its lungs for breathing; therefore, the right side of the growing child's heart does not have very much work to do, for instead of going to the lungs for oxygenation the blood is shunted, or short circuited as it were, into the systemic circulation through an opening in the fetal heart called the foramen ovale and a channel called the ductus arteriosus. But the left side of the developing heart, which supplies the greater circulation, is very busy distributing throughout the child body the mother's blood, beating along independently at a rate of from two to three times as fast as the mother's.

HEART CHANGES AT BIRTH

Another superb exhibition of adaptability occurs when the infant is born. Here again is a brand new circumstance for the child heart to meet. The necessity for breathing now arises in a newly independent existence. So when breathing starts an opening that was between the two auricles closes. The opening was necessary to maintain the circulation only in the unborn child. Incidentally, when this opening between the right auricle and the left auricle does not completely close shortly after birth, there results the phenomenon of a blue baby,—simply because blue blood from the right side of the heart passes through the unclosed channel (patent foramen ovale) and mixes with the bright rich arterial blood, changing the baby's natural pink hue to a bluish duskiness. That is why most babies are kept on the right side of their bodies for the first ten days of life, for lying on the right side facilitates the closure of this opening between the

auricular reservoirs and insures the permanency of the closure.

INAUGURATION OF THE LESSER CIRCULATION

Yet the heart is now only beginning to exercise its astounding powers of adaptability. The left side of the heart has, of course, been practicing contraction for months while the child was in utero. However, at birth the necessity of breathing initiates the function of the as yet inexperienced right side of the new born child's heart. Being unpracticed and having such a load suddenly thrown upon it, the right side of the child's heart enlarges, in order to accommodate itself to the new circulatory demand. This right sided enlargement continues for the first five or six weeks of the baby's life, at which time one side no longer preponderates over the other in size; a balance is maintained by the ventricles until the latter years of life, when the left ventricle preponderates. But of this left sided heart enlargement of later life we shall speak farther on; suffice it here to say that all through life, from the moment of birth to venerable age, the heart exhibits an astonishing versatility in its power of adaptability, thus perpetuating the existence of the creature with a loyalty, a faithfulness and a devotion to duty that proclaims the heart's Divinity.

THE HEART AT WORK

Do not think of the heart as some frail structure that is likely to collapse on the slightest strain. Neither regard it as a mechanism so delicate that when once impaired it

must remain forever inefficient. That little human heart, but a trifle larger than its owner's fist, is the most powerful of all the muscles in a man's body. In a woman's body its muscular power is excelled only by the dynamic contractile force of the womb in labor. So powerful is the heart that the work force which it puts out in one minute is equal to raising a weight of seventy-eight pounds to the height of twelve inches. In one hour the heart will have put forth a work force equivalent to lifting over two tons weight one foot into the air.

THE HEART AT REST

Of course, all this work force is not expended in continuous and uninterrupted effort. The heart rests between beats,—actually rests more than it works. Power does not flow from the heart in an avalanche like ever rushing Niagara.

As a matter of fact, a well heart pauses after each beat, and it is this pause (diastole) which affords the opportunity for rest, while blood is flowing from the vessels into the heart. Then again it contracts (systole). The rest period between beats is almost twice as long as the beat itself. For example, in a heart that beats seventy-two times per minute, each squeezing-and-filling period is eight-tenths of a second in duration. Of this brief time, three-tenths of a second is required for the squeeze and five-tenths of a second is taken by heart rest, while the filling of the heart chambers with blood for the next squeeze takes place. Thus the ratio of work to rest is as three is to five.

Apply this ratio to a day of twenty-four hours—and

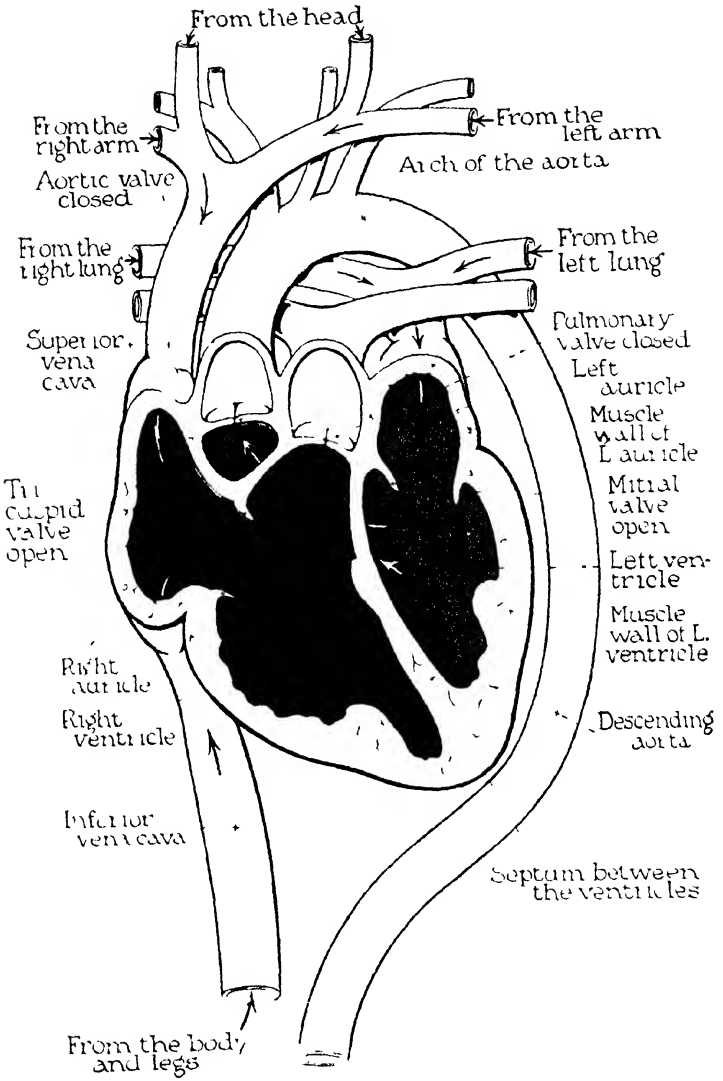

FIG. 3.—THE DIASTOLIC (FILLING) PERIOD OF THE HEART During the filling or rest period the heart is not contracting and the blood accumulates in the ventricles for the subsequent squeeze

we find that the heart is actually at its work of squeezing for only nine hours and that it rests fifteen hours out of the twenty-four. Interesting—isn't it?—to know that a healthy heart believes in a nine hour working day! However, it cannot take that amount of rest all at one time,—as a weary leg can do. The heart must seek and find its rest throughout the day, for just a brief interval between beats. Lengthen that interval and heart rest is increased; speed up the heart with incessant physical or emotional demands and heart rest is decreased. Even at this early point the reader must begin to see the value of mental, physical and emotional rest in treating heart affections.

FUNCTIONAL AND ORGANIC HEART AFFECTIONS

Chambers, valves, conduits, internal conduction system and external nerves, all comprise the heart. Any one of these can become structurally altered and thus is created a condition of ill health known as heart trouble.

The lesser affections of the heart are spoken of as functional, for they have only to do with the improper functioning of the organ and are more or less transient in nature, depending on how soon the causative factor elsewhere in the body can be identified and eradicated. When such exciting factors are not identified, when the early symptoms which they induce are neglected or when some disease overwhelms another part of the body and at the same time its toxins invade the heart muscle, then sooner or later the individual develops actual impairment of the

heart structure itself, which is known as "organic heart disease."

Whether a person has a functional heart disturbance or whether he has organic heart trouble, there is an immediate obligation that the warning sign be respected and that general health measures and special heart care be promptly instituted. Thus by relieving the load and conserving the output, the heart handicap may be overcome.

The reader by now should have a fairly clear comprehension of the normally acting heart. Without such an understanding of the anatomy and physiology—the structure and function—of the heart in health one can form no conception of the heart in illness. Surely a restudy of this present chapter will enhance the reader's fundamental knowledge of that divinely inspired mechanism which controls the destiny of the human frame.

CHAPTER III

HOW HEARTS ARE HURT IN CHILDHOOD

The heart starts out in life with a heritage of health, fully equipped to perform its functions, and with an inherent reserve force that can be called upon successfully to meet any ordinary circulatory emergencies.

Occasionally, a child is born with a congenitally defective heart, the defect having particularly to do with malformations in structure, as when one heart chamber is entirely missing. But these congenital defects are so rare as to constitute medical curiosities and the malformed heart seldom survives over the first few days of extra-uterine life. Those congenital heart defects that attain to maturity are virtually all of the types known as persistent *foramen ovale* or *ductus arteriosus* (a channel from the pulmonary artery to the aorta), the terms meaning that an opening or an accessory tube that was necessary only to the circulation of the unborn child, fails to become obliterated shortly after birth and persists in after life. Infants who come to adult maturity with these two noisy congenital defects persisting seem to be healthy enough, but are not strikingly vigorous.

An unusual congenital condition that is not, however, a congenital *defect* is a prank of Nature called *dextrocardia,* the heart being situated on the right side of the chest, instead of on the left. This reversal of site does not

hamper the heart nor embarrass the activities of its possessor in any way. Two persons so affected carried on efficiently as soldiers with the American Expeditionary Force. Dextrocardia is merely a natural curiosity that causes doctors to wonder at Dame Nature's moods, particularly when she produces twins, each with its heart on the right side, while the hearts of older brothers and younger sisters are situated as usual in the left chest.

THE HEART INHERITANCE

The vast majority of hearts start their independent existence with a heritage of good health. Even though the parents suffered from heart trouble, however severe, they could not transmit it to their offspring.

Heart derangement is not inherited; it is acquired. Of course, there are families who have had very strong hearts throughout many generations, and there are other family groups in whom the ancestral heart has never been particularly strong. The familial type of heart can be transmitted just as can other family characteristics, such as stature and build. A mother, whose heart had always been scarcely sufficient to meet the demands of her daily existence, might transmit to her daughter a tendency to heart weakness and such an inheritance would be more liable to develop heart trouble later in life than would a stronger heritage. That is why the children of parents who are known to have a heart affection should be especially trained, guarded and developed by both parents and physician to overcome the family tendency and thus emerge into adult life with stout hearts.

The integrity of the heart is threatened by many cir-

cumstances as it goes through life, regardless of its inherited characteristics. Hearts are hurt principally by two groups of causes. The first is circumstances within the individual's control and which can be avoided. The other embraces circumstances beyond the individual's control which cannot be averted and which must be combated.

Beyond the individual's control early in life are congenital defects, chest deformities, chest injuries and accidents, which may directly affect the heart. Such circumstances are beyond any one's control. But not so with two of the contagious diseases which beset childhood, diphtheria and scarlet fever. Both are within the parents' control, for the child's susceptibility to these diseases can be determined by simple tests, which will foretell whether or not the child is a candidate for either contagion. If there be a susceptibility to diphtheria (Schick test), the child can be immunized against that disease; if tests show that the child is not naturally immunized against scarlet fever (Dick test), then extra precautions can be taken to protect its health when that disease appears in the community.

THE TONSILLAR TRIO

The tonsils may serve as a portal of entry for three infections which attack the child heart—rheumatic fever, St. Vitus' dance and tonsillitis.

The heart in childhood is likely to be viciously wrecked through the implied innocence of the complacent and deplorable term "growing pains." There is no such thing. Growing is not a painful process. Growing pains mean subacute rheumatic fever always. And rheumatic fever,

unrecognized and untreated, impairs to some degree ninety per cent. of the hearts that give it combat.

Is rheumatic fever preventable? No, not yet. Probably never. There are so many causes which seem to produce it that one prime factor will perhaps never be determined. But rheumatic fever can be anticipated, and its course and after effects either modified or averted by early recognition of its advent.

The forerunners of rheumatic fever may be "growing pains", repeated attacks of tonsillitis or any aching of muscles or joints that persists or has a tendency to recur. Any such succession of minor events is a reason for suspecting the lurking possibility of rheumatic fever, without waiting for the eventual arrival of clear cut signs, such as swollen and painful joints, fever, sweats and heart involvement in a person who will be prostrated in bed over many weeks.

Do not confuse rheumatic fever and "rheumatism", which latter term physicians never employ except colloquially, but which some medically untrained people seem to use to describe every muscular strain, nerve twitch, thickened joint or intestinal disturbance that annoys them.

ST. VITUS' DANCE

St. Vitus' dance (chorea) is another peril of the child heart for which there is no preventive. An attack of tonsillitis usually precedes an illness from St. Vitus' dance and also an illness from rheumatic fever. This observation should put parents on their guard, so that they watch with vigilance their children's tonsils.

The casual statement "only a little sore throat, it will

be well in a day or two" has resulted in the failure to recognize in their early stages these two diseases, rheumatic fever and St. Vitus' dance, which deal very cruelly with the child heart. Even though the heart invasion is not in evidence at the time of the acute illness, the circulatory injury wrought in childhood may be uncovered later in life, when the adult is under some mental strain, physical emergency or illness.

OTHER DISEASES OF CHILDHOOD

Pneumonia deals far more kindly with the heart in childhood. Its invasion is not directed against the heart with such emphasis as is shown by rheumatic fever and St. Vitus' dance. Pneumonia, too, usually makes known its presence elsewhere long before the heart is invaded; the patient is already in bed and under medical care, and thus the heart's integrity is guarded, as the disease runs its brief course and the heart may be expected to escape serious or permanent damage.

Measles, mumps and whooping cough are grouped as the ordinary (impliedly innocent) diseases of childhood that are popularly supposed to leave the heart untouched. But it must be remembered that these are infectious conditions and like any other infectious process are liable to involve the heart. Therefore, children with these supposedly harmless diseases should be medically supervised not only during the duration of quarantine, but for a longer period until convalescence is thoroughly established, —remembering that the word convalescence means to grow strong.

In summing up the manner in which the heart is hurt

in childhood, it seems that most of the damage is wrought by the acute infectious contagious diseases, many of which are within parental control. The likelihood that some of the diseases will attack a given individual can be foretold. The spread of any contagion can be controlled by quarantine. Heart damage can be to a large extent prevented by a longer period of convalescence than is generally practiced. The mere lifting of quarantine is no guarantee that the individual child has fully recovered from a recent exhausting illness. There are other infections of childhood which are not within the control of parents, but which can often be anticipated by suspecting the tonsils when a child is indisposed. Being thus forewarned is to be forearmed in the protection of the child heart by considering removal of the tonsils.

CHAPTER IV

THE HEART IN ADOLESCENCE

The heart's adaptability is put to a test in meeting the physiologic changes and the growing demands through which the body passes during the years that intervene from puberty to maturity. The heart, itself maturing, would seem to have enough to do in meeting the requirements of bodily development. Added to these demands of growing are the secretions from certain glands, which spring into activity at this time of life, in some instances completely changing the individual. As the internal secretions from these recently active glands are poured into the blood, the heart responds to their introduction.

At this age there is also a mental awakening to environment, an awareness of life and an emotional exuberance with a nerve excitement, which are reflected in the heart's behavior. Every chord in every organ is attuned to vibrant life.

Thus there arise minor heart vagaries that are physiologic and by themselves of no particular import, such as a heart that overacts, pounds and races at times, with transient chest pains and intervals of hurried breathing. A livid complexion may be followed by paleness of the skin, or the color change may take the form of blotches or mottling. The rhythm of the pulse may vary and mothers are often disturbed by noticing that when the youth is asleep the rate of the heart waxes and wanes,

increasing on inspiration and decreasing on expiration (sinus arrhythmia). When this adolescent type of heart does not come to the notice of parents, it is often brought to their attention by a physical examination conducted at school or college.

So far we have spoken of the heart's ability to meet the ever changing and ever increasing demands of an adolescence which develops normally. But when the development of the body is abnormal in a youth who is growing too fast in stature or build, then the heart becomes incapable of meeting the excessive demands of abnormal growth and becomes as inefficient as though actual structural change had taken place in that heart.

The picture is familiar to physicians of a tall overgrown youth, shiftless in carriage and frequently sluggish in mentality, who is continually tired, disinterested and unresponsive and therefore unjustly regarded as indolent and lazy. A special heart examination of such a lad is likely to reveal distinct valve murmurs, enlargement of the heart to the left with low blood pressure readings and a thin thready pulse. These signs indicate that the physical development has proceeded at a stride too rapid for the heart to carry on and maintain an efficient circulation. Consequently, these stressed hearts require rest and special care over a period of perhaps several months, just as would be given a patient with organic heart impairment; but with this gratifying difference in result; the overstrained heart of youth may be expected to attain to a full circulatory efficiency, emerging unscarred for the future battles of life.

Returning to the normally developing heart of youth;

it will under ordinary circumstances easily adapt itself to the physiologic loads of growth and glandular activity. But when to these are added the physical and emotional excesses of the thoughtless age, heart handicaps are to be expected. Emotional excesses of youth embarrass the heart in minor ways. Homesickness is an outstanding example. Children are frequently returned to their homes by physicians at boarding schools, in order that heart balance may be reasserted amidst familiar surroundings.

YOUTH'S PRODIGALITY

There are times when youth overreaches itself in stretching out to grasp the pleasures of the moment. Young people do not realize that there is a limit to the spending of enthusiasm and energy. The continual seeking for entertainment and diversion throughout the days and into the nights, with no relaxation and but little actual rest, will eventually exhaust the heart's reserve force and threaten its future efficiency. When a youth comprehends that by thoughtless squandering of physical reserve he not only jeopardizes the future of his heart but also his prospects in business, he will watch his expenditures and conserve his physical assets, in order that he may take his place in the world of affairs.

Most youngsters indulge in dietetic errors; either by the gorging of food, by irregular habits of eating, by pandering to the artificially created appetites of soda fountains or lunch counters or by being permitted to select at their home tables only certain articles of food to the exclusion of other varieties that round out a well balanced

and hence highly nutritious meal.* Result: digestive disturbances with attendant constipation, intestinal putrefactions and ensuing absorption of toxins that bring on physical weariness, aching muscles, malnutrition, a failure to gain weight, all of these probably reflected in unnatural behavior of the heart.

PHYSICAL STRAIN

Physical strain is likely to induce serious damage in an adolescent heart. Overindulgence in tennis, swimming and wrestling, beyond that point where fatigue sounds the warning note to desist, may so stress the heart that the valve leaflets fail to approximate and a functional murmur results. Repeated physical overstrain aggravates the heart condition and persistent striving in sports will lay a foundation for the athletic type of heart, which thereafter is never again fully efficient when at rest, but only when working under heavy load. Hearts thus impaired fall easy prey to infectious conditions in after years and are likely to succumb early to the changes in heart tissue, which take place in us all after middle age is attained. Perhaps that is why we see so little and hear even less in later life of the once stalwart gridiron warrior or track athlete.

Suppose one were to stretch and overstretch a rubber band repeatedly and continually; soon its resilience would be gone, and that overstretched rubber band, when at rest, would not retract to its original diameter. In rubber this is called a lack of resilience; in an athlete's heart, it is a lack of tone. In former days such a heart was said to be "hypertrophied," a word meaning overnutrition which,

* Food is discussed more at length on page 100.

if it did occur in a heart, could scarcely be recognized as such during life.

ATHLETIC HEART

Athletes' hearts—or hearts that are overstretched by physical overstraining—do not arise from the physical activities of mature men, who have gradually trained that organ to tolerance. Most athletic hearts owe their inception to the excessive physical effort that is put forth during the adolescent period of heart development. It is very doubtful if any benefit is derived by a youth from the intensive physical training and the attempts to create endurance and stamina in the contesting and competing teams of college days. College spirit and the determination to win will often press a youth beyond his powers of endurance and beyond the ability of the heart to react to excessive strain.

VALUABLE FORMS OF EXERCISE

Gymnastics and other forms of exercise in which the element of competition does not enter are of course valuable adjuncts to the physical training, muscular development and efficient function of the internal organs, all of which are necessary to sustain a strong body that supports a strong mind. Such milder forms of exercise should be adopted by all adolescents of school and college age, providing that the following fundamental precept is continually borne in mind in order to protect the heart: **Effort must cease when it brings on heart hurry, shortness of breath, chest oppression, chest pain or physical fatigue.** Indeed that sentence might well be called the heart's

exercise creed and it should be inscribed on the walls of every gymnasium, displayed in all training quarters and posted at all the athletic fields of the college world.

FOCAL INFECTIONS

Focal infections may retard the normal course of development in adolescence, or may be responsible for the vague impression of ill health which some growing youths exhibit. Focal infections mean that the disease, instead of being disseminated, is centralized at one definite point or focus in the body. For example, the focus may be at the apices of teeth or located in the tonsils or nasal sinuses. From this point the infection may be carried by the lymphatics to various organs of the body, such as the heart.

THE ROLE OF INFECTIVE TONSILS

The tonsils are two glands, in health each about the size of an almond. They are located on each side of the throat in the back part of the mouth. One of their functions in health is to arrest and destroy germs which otherwise would gain access to the body by way of air and food. In fulfilling this duty the tonsils may eventually be overwhelmed by the diseased germs which they combat and themselves become diseased. Then they are no longer an asset to the body; they no longer play their part in developing an immunity to various diseases. Once infected, they become a menace to the heart.

Infective tonsils, even though never attracting attention by becoming acutely inflamed, are the most likely cause of general malaise, mild febrile reactions, lassitude

and languor, which characterize some youths who seem to be perpetually tired. Focal infection at the hidden apex of a tooth is also likely to produce these symptoms; but dental infection does not occur nearly so frequently in youth as in later life. In youth diseased tonsils dominate the field of focal infection.

Suspicion is directed to the tonsils, first, by a history that includes either diphtheria, St. Vitus' dance, scarlet fever, repeated attacks of tonsillitis, quinsy or frequent sore throats. Tonsils that have battled with such conditions are, in all probability, chronically infected, even though they have not been acutely inflamed for years. Infective tonsils may be either large or small, smooth or rough, pale or injected, bound down or free. They may or may not contain small cheesey particles. Regardless of these physical characteristics, a tonsil is incriminated by its history and by the fact that it exudes pus when examined by a physician. Tonsils thus indicted are no longer useful and, regardless of the age of the patient, are a constant menace to the future integrity of the heart.

DISEASES IN ADOLESCENCE

In this chapter we have referred particularly to those sources of adolescent heart hurt which are frequently overlooked. Of course, almost all of the diseases to which human flesh is heir can occur during childhood, adolescence or old age. While certain diseases seem to select certain age groups, no disease confines its invasion to a particular time of life. Hence, we find adolescence exposed to the contagions of childhood and to the infections of later life.

We already know that adolescence throws certain physiologic loads on the heart and rheumatic fever occurring in a young adult seems even more prone to affect the heart at that time than in childhood. Tuberculosis develops with greatest frequency during adolescence, but very rarely leaves a heritage of permanent heart damage. Pneumonia, typhoid and other fevers are more prostrating and more severe in adolescence, and the occurrence of any disease in a young adult should always call for special attention to and care of the heart during the illness.

A brief allusion here to venereal diseases is sufficient, for they seldom figure in the production of adolescent heart defects. One of these, gonorrhoea, which in former days frequently spread to the joints, producing gonorrheal arthritis and seriously involving the heart, is now rarely seen, owing probably to a knowledge of venereal prophylaxis which was introduced and insisted upon throughout the armies of the World War. The other venereal disease, syphilis, does not ravage the heart of adolescence; for in this instance adolescence can be only the age of infection, the disease rarely being manifest in the heart's behavior until fifteen years have elapsed following the initial lesion.

YOUTH THE REPRODUCTIVE AGE

In passing from a consideration of the heart in adolescence to the heart in later youth, there comes up for discussion matters pertaining to sex life in connection with the heart. The marriage relation is one of the natural

functions of a normal body and therefore should react beneficially on a healthy heart.

CONSIDERATIONS OF MARRIAGE

There is a widespread belief that a person with a heart affection should not marry. The belief is, generally speaking, a mistake. Everyone of course will admit that a person with a heart defect that is progressing in severity should not marry; an outstanding example would be the valvular disease known as aortic insufficiency. However, the vast majority of heart affections are not progressive and can, by modified living, be so kept in the background as not to be apparent whether one is single or married.

If a heart patient is considering matrimony, the logical order of inquiry would be to ascertain, first, whether the doctor considered the heart defect to be stationary. The next step would probably be to inform the other person of the existence and nature of the heart trouble. If the proposed alliance were not to materially alter the modified manner of living of the one; if it did not entail the hardships of travel or impose new duties that were physically burdensome; if the two were temperamentally suited to each other and had common interests that would minimize the frictions which arise during that period when dispositions are becoming adapted one to the other; there then would be but little reason to avoid matrimony as far as the heart is concerned. Indeed, the benefit which is to be derived from congenial companionship and from the renewed interest in living, frequently makes marriage an asset to a heart patient rather than a liability. There is one other major consideration that enters into the sub-

ject; it is usually not to the advantage of a heart patient to join in matrimony when either partner is many years the junior of the other. The reasons are obvious.

MOTHERHOOD

Motherhood may be a deterring thought to a heart patient who is contemplating matrimony. When the considerations above set forth concerning marriage are satisfactorily met, there can be no objection to motherhood. It is amazing with what little disturbance even badly damaged hearts will undergo the months of expectancy and the hour of birth. If the reproduction of kind is the consummate purpose of all living things, then it seems that Nature unlocks or creates reserves in damaged hearts, to meet the demands of reproduction—reserves that are not to be counted upon in any other circumstance of heart life. Certainly, there is a heart load in expectant motherhood. One body must eliminate for two, furnish the nourishment for two and supply from her own stores the growing demands of that intricate structure which Nature is evolving. These proceedings impose a stress of some degree on the parent heart; but the load is a gradual one, starting from an imperceptible beginning and added to so gradually as the weeks go by that the heart readily adapts itself to the increment,—to a load which, if thrown suddenly in its aggregate upon the body, would surely overwhelm mere flesh.

Recognizing then that there is such a thing as the heart load of expectant motherhood, it is wise for a heart patient to observe the rules of heart care even more faithfully at this time than at others. Obstetricians make

periodic physical surveys of expectant mothers, and when early under the guidance of physicians skilled in that art, there is no reason for a heart patient to become alarmed when called to participate in the most sublime service that any individual can render humankind—Motherhood.*

RÉSUMÉ OF THE HEART IN YOUTH

To review: The adolescent heart is subjected to unusual demands by the changing physiology of a growing body. The irresponsibility and the emotional conflicts of youth may throw a load on the growing heart that impairs its usefulness. A disregard of rest and an excess of physical exercise may strain and permanently damage the heart musculature. Diseased tonsils are a source of infection that is likely to reduce and to gradually break down the heart's resistance during the years of adolescence.

* From "How Is Your Heart?" by S. Calvin Smith.

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CHAPTER V

THE HEART IN MIDDLE LIFE

Just as youth has its hazards, so middle life has its handicaps for the heart.

No longer charged with the buoyancy and resilience of youth, no longer possessed of the reserve force and the aggressive recuperative power which early life confers, no longer buoyed by the imagination and enthusiasm of the young, the heart and circulation at middle age initiate those microscopic tissue changes which, in the aggregate, eventually produce old age.

The heart cannot remain forever young. It has its seasons as the year, for Autumn comes, then Winter. Nor is this to be regretted; old age has its enjoyments and rewards, as youth has its pleasures and anticipations. Our sympathies should not be for declining years, but rather for those individuals of middle age who blithely regard their hearts as possessed of eternal youth, not realizing, until disaster threatens, that Nature's inexorable laws create the impaired heart of middle life.

There are changes in the body's physiology that furnish the background for the changing heart of middle life. First of these are the glandular secretions which sprang into activity in adolescence and which, as they recede in middle life, leave the heart to some degree unactivated by their influence, inducing in women the phenomenon called the menopause and in men an equivalent, but less

intense and less tangible, change of life. Again, during the age of growing there was an accumulation of physical reserves and such assets could be drawn upon to meet the heart emergencies of early adult life; but middle life supplies are not so abundantly created and often the vitality accruing in one day is spent in that day's occupation, so that there may be no reserve assets for the heart to draw upon in emergencies.

CAPILLARY CHANGES IN MIDDLE LIFE

In adolescence the net work of capillaries in every organ and every structure extends and increases; in middle life the capillary network tends to diminish and retract (capillary fibrosis), thus reducing the nourishment to each structure of the body, including the heart. With the reduction in nourishment there naturally comes an impairment of the function of the organ affected, and upon impaired function there would follow congestion and defective elimination. Such physiologic changes explain why in middle age a muscle or an organ tires rather easily; there is not sufficient nourishment with which to carry on. The part may develop some little ache or pain, because the products of activity are not eliminated promptly.

ADAPTABILITY IN MIDDLE AGE

The human body can so adapt itself to the physiologic changes of the forties that they need leave no impression on the normal activities of that age. Nature has already prepared the way for the enjoyment of middle life, when she removed from it the allurements, the enticements, the inspirations, the enthusiasms and the spirit of con-

quest that dominated youth and impelled it onward to attainment. In middle life the spur of such youthful incentives is dulled and he is indeed a foolish man who dares to presume that he can carry on at forty-five as he did at twenty-five and not pay the penalty for such flagrant transgression of Nature's laws.

Understand, that the heart in middle life does not protest against the physiologic changes in themselves considered; but when to the physiologic changes are added other loads, such as business activities and mental responsibilities, there then may arise the various heart affections of middle life.

THE BURDEN OF PHYSICAL STRAIN

The continual putting forth of physical effort is a most common cause of middle age breakdowns of the heart. Consider, for example, the modern man of affairs, whose mornings are spent in an energetic pursuit of business, whose afternoons are given over to intensive muscular exercises and who rushes through the evenings into the nights, seeking diversion or attending various functions, going along through the weeks with an utter disregard of health's necessities,—diet, rest and sleep.

When the middle aged heart eventually protests against such abuses, the man regards the protest as an evidence of physical weakness and to increase the heart's strength insists on still further physical effort. Should the kidneys fail to function properly on account of being tired from overwork, the man may assume that they are sluggish because his exercise has not been sufficient, or he may decide to flush the kidneys with copious draughts of

liquids, thus ignorantly adding to their burdens. Should his thinking be slow because of brain fatigue from insufficient blood supply, the strenuous person insists that his forgetfulness or lapses of memory again are due to insufficient exercise in the open air, so he hies him to the fields of sport, there to pile Pelion on Ossa, preparing the way for an almost certain breakdown in his heart and circulation. Thus a failure to recognize the circulatory limitations of mid life, plus a fanatical belief in the benefits conferred by exercise, may literally break the heart.

THE BURDEN OF EMOTIONAL STRESS

The mental stress of middle life is fully as important as is physical strain in producing heart derangements at this period of existence. The anxieties that attend big business, with its financial responsibilities, with the struggle against competition and with the problems of manufacture and the solution of labor difficulties, all tend to produce psychic strain and nervous breakdowns of middle age, which are reflected in the heart's behavior. No less unfortunate for the heart are the anxieties of parents over wayward sons and erring daughters, and among the more acute forms of grief, mourning over an irreparable loss may literally break the heart. The emotional loads of married persons, who are physically unmated and at mental tangents with each other, may bring on alarming heart symptoms and in some instances have precipitated attacks of angina pectoris.

Thus the physical strain and emotional stress of middle life advance and intensify the natural and physiologic changes of that period which, while harmless in them-

selves, become through such amplification what are known as the heart deteriorations of middle life.

"ACUTE INDIGESTION"

The average speed of persons who are rushing along through the perilous forties allows very little time for considerations of diet. Such important matters as the necessity for food, its selection, variety, compatibility and digestibility often are waved aside for the hurried convenience of a sandwich. Such an unconsidered luncheon, following on a hastily swallowed breakfast, paves the way for digestive disorders which, were they only occasional and isolated, might be innocent enough. But repeated dietetic errors, coupled with the capillary changes which take place in heart and stomach in mid life, plus its physical and mental strains, all conspire to incite a revolt in both organs and precipitate that reign of terror called "acute indigestion."

The "acute" phase promptly subsides. The "indigestion" is only a matter of a few hours; but the associated heart damage likely persists for weeks, maybe for months. An attack of "acute indigestion" is in reality a severe and violent heart prostration. The manner of its production is simple.

Food that is to be digested requires a blood supply from which digestive juices are made and the heart of course must supply the demand. If at the moment the full requisition cannot be delivered, then the food is not digested fully and becomes a fermenting mass, creating gas pressure which may not only mechanically oppress the heart, but also might affect that organ adversely by

way of a pneumogastric nerve reflex. Belching frequently relieves the mechanical pressure on the heart, causing the afflicted person to feel more comfortable; but belching does not mitigate the circulatory embarrassment.

Consider the heart's predicament. Its pristine efficiency impaired by the circulatory changes within its own musculature which come with middle age, it is called upon to supply blood to the digestive apparatus and also to the skeletal muscles of the person who eats and runs or is under a mental strain. It is pressed upon by the fermentations of an undigested mass directly underneath. Furthermore, its rate is no longer controlled by the inhibitory (pneumogastric) nerve and the accelerator nerves drive the already harassed heart at a furious pace. Pandemonium reigns in the heart and to relieve the circulatory delirium outraged Nature hurls the afflicted person prone to the ground in a desperate effort to ease the load and thereby conserve the heart. To onlookers, it is an attack of "acute indigestion"; to the heart, it is a revolution that shakes the very foundations of its stability.

Then and there may be created the injury to heart or adjacent vessels that furnishes the background for the angina pectoris of later life.

So be not beguiled by the comfortable thought that repeated digestive disturbances in middle life, even though they are comparatively trivial, are to be waved aside with the gesture of inconsequence, as were the stomach upsets of childhood days. Repeated digestive disturbances in middle life, however unimportant they may seem, require that a thorough and exhaustive study of the heart and circulation be promptly conducted.

MID AGE INTENSIFIES MINOR CONDITIONS

Various diseases also contribute to the burden of a middle aged heart. It is logical that an organ already impaired in circulation, be it the heart, kidneys or brain, should fall an easy prey to minor diseases, which would be of little consequence had the organic resistance been unimpaired. Thus we find in middle life that influenza may produce serious heart damage. Common colds also may leave in their wake a sense of heart consciousness. The eating of an excess of meat may produce a nephrosis in kidneys, which earlier in life were well able to eliminate protein excesses; and disordered mental function, which might be called insanity, could attend an imperfect circulatory supply to the tired brain.

BLOOD DEFICIENCIES

Deficiency or impoverishment of the blood (anemia) is another example of a condition that could have been present and unnoticed for years, sharply coming to the front only when the capillary changes of middle life reduced the heart's nourishment.

The heart may carry on fairly well when its only obstacle is a lowered red cell count of three million, rather than a normal five million, and when the hemoglobin is reduced to sixty per cent., rather than the usual level of eighty per cent. But when to this impaired nourishment is added the capillary changes of middle life, which further reduce the distribution of nutriment, then the heart may be expected to protest, producing the symptoms of early tiredness on accustomed effort, heart hurry, overaction,

faintness and dizziness. The possibility of anemia is one of the reasons for insisting on laboratory studies of the blood when investigating heart impairment in middle life.

DENTAL INFECTIONS

Dental infections are more likely to become manifest in middle life than at any other age period. Faulty circulation at the apex of a tooth is not necessarily the cause of this prevalence of dental decay in mid life. It is more likely that a general lessening of bodily resistance permits infections, which have long lain dormant at the root ends, to spring into activity and thus focal infection is disseminated, affecting the heart.

Therefore, in seeking the cause for heart and circulatory disturbances at any age, but particularly in middle life, it is wise to suspect the teeth as being possible foci of infection, until their innocence has been established by a thorough and complete examination of every root end.

Teeth requiring critical study are those which have been capped, crowned, faced or pivoted. Also those teeth which serve as bridge abutments, for the extra loads which are fastened upon them by such appliances requires them to perform the work of the missing teeth, thus doubling or trebling the strain upon the abutments, eventually decaying their roots. Other teeth probably infected are those that have large central fillings, for in them the principal nerve has been either previously destroyed by disease or purposely removed.

The infective possibilities of such teeth are determined by electrical tests for vitality, by transillumination for

periapical shadows and by x-ray examination, to ascertain not only the possible presence of an abscess, but more particularly a thickening of the peridental membrane.

Once a tooth has been centrally filled, the possibility of an abscess eternally overhangs that tooth. It may remain forever quiescent or it may become at any time a precipitating cause of heart trouble. It is not necessary that a diseased tooth should produce pain, tenderness, swelling or give any other local physical signs of its presence. Chronic dental abscesses are often symptom free and silent.

IDENTIFICATION OF DENTAL CULPRITS

When dealing with heart patients it is necessary to use good judgment in deciding upon the extraction of teeth. Even though several abscessed roots have been found by x-ray, there still may be no evidence that any one of the teeth is affecting the heart directly. Therefore, all other possible sources of heart hurt should be ruled from consideration before destroying the natural architecture of the mouth. In doubtful instances, a single extraction on suspicion may be warranted and a bacteriologic culture of the apex and socket then be made. If certain germs are found therein which notoriously affect the heart, then there is good reason for extracting the remaining accused teeth, even though the heart impairment be particularly pronounced at the time. But if the culture is negative, further extractions might better await improvement in heart health.

MAKE HASTE SLOWLY IN EXTRACTIONS

When a number of teeth are to be extracted, caution is necessary. No more than one or two should be withdrawn at one time, as the stirring up of infections and the reaction to the operative insult may be expected to aggravate the heart condition temporarily. Therefore, intervals of five or seven days should elapse between the extractions, with the patient regarding himself as a semi-invalid during the intervals.

The wholesale extraction of a number of teeth at one sitting may precipitate cardiocirculatory disaster in any person, regardless of their previous state of health.

INSUFFICIENT MASTICATING SURFACE

An insufficient chewing surface results when the back teeth, or molars, are destroyed. Some people otherwise clever think that if they retain their front teeth the absence of the others does not matter much. They forget that the front teeth are designed merely for cutting purposes, while the back teeth are all essential for the grinding of the starches. If starchy foods are not thoroughly ground, and through insufficient grinding not thoroughly mixed with the digestive juice called saliva, that bolus of food when swallowed goes to the stomach with the initial stage of starch digestion incompleted. How can the stomach proceed with the second stage of starch digestion when the first stage has not been properly performed by saliva penetration in the mouth? As a result, digestive disturbances are likely to arise, which disturbances are reflected in the heart's behavior.

There are altogether on both sides of the upper jaw, four molars which grind food; if one of these molars is absent, or if the tooth with which it approximates in the lower jaw is gone, then the absence of that one grinding tooth means a loss of twenty-five per cent. in grinding efficiency. Every person interested in heart health should see that modern dental restorations make the masticating surface one hundred per cent. efficient.

GUM INFECTION

Pyorrhea, or thick spongy bleeding gums that sometimes suppurate, does not seem to affect the heart so directly, as do abscesses at the roots of teeth. However, pyorrhea, with the mechanical impediment to thorough mastication which accompanies it, as well as the absorption of pus from suppurating gums, may cause general constitutional disturbances which, in turn, reflect in the heart's behavior. Oral hygiene can overcome the condition and oral cleanliness can be assured through periodic visits to the dentist.

Hence, a thorough clinical dental examination, supplemented by x-ray study, should be a routine procedure in searching for the cause of heart disturbances, particularly in middle life when dental disease is most likely to involve the heart.

TONSILLAR INFECTIONS AND NASAL SINUS CONDITIONS

Another menace to heart health in middle age, that may be overlooked, is infective tonsils, which are discussed at length on page 36. The para-nasal sinuses oc-

casionally may participate in the production of heart derangements, either in the form of sinus infections, which are often manifest at this time of life, by post-nasal catarrhal secretions or by defective ventilation induced by obstructions or malformations within the nose. Thus a thorough nasal examination should be made when other searches for the hidden cause of heart trouble have proven unproductive.

THE GROUNDS AND FIELDS OF THE EYES

Eyes that tire easily and eyes that develop a tendency to shrink from light may be giving early information of circulatory importance. In searching for the cause of vision disturbances, examination of the eye grounds frequently shows beginning changes in the capillary blood vessels, long before such changes appear elsewhere. An examination of the fields of vision may record beginning limitations therein, and such a finding probably indicates toxic or infective processes somewhere in the body, which can be disturbing the heart as well as the eyes.

It is important that eye examinations be conducted by an eye physician, who is a graduate of Medicine and who therefore regards the eye not only as a maladjusted lens that requires correction by glasses, but who more importantly surveys the eye in its relation to other organs of the body, thereby giving the patient all the advantages that a general knowledge of Medicine may convey.

OVERWEIGHT

At middle age there is a natural tendency to put on weight. A gradual increase is generally regarded, and correctly so, as an evidence of health.

However, a gradual loss of weight should be investigated, as the cause may be diabetes, which has a definite toxic influence on the heart. Attempts to reduce weight by drastic dieting or by the taking of drugs without the advice of a physician is almost certain to affect the heart adversely.

When an increase in weight amounts to overweight or when the increase is rapid, the heart may register protests as the load is added, producing the familiar florid face and panting breath that stout persons exhibit after exertion. Such minor heart embarrassment, when induced by overweight alone, seldom progresses to acute prostration; but the possibility that kidney conditions may coexist should keep one on the alert for high blood pressure complications.

A rapid accession of weight, such as deposits of fat, or an accumulation of fluid in bodily tissues, may, on only ordinary exertion, cause the overstrained heart muscle suddenly to weaken and thus fail in its duty of sustaining the circulation. Therefore, sudden gains in weight are among the several causes of heart failure, as the condition is correctly called, although known colloquially by the incorrect phrases "acute dilatation of the heart" and also as "fatty degeneration of the heart." Modern Cardiology has shown that what was once considered to be "acute dilatation" is actually the irregularity of auricular fibrillation and such a thing as an "acute dilatation" has never been proven. As far as "fatty degeneration" is concerned, it is so rare that nowadays the diagnosis virtually never appears in the clinical records of hospitals.

So people who gradually increase in weight need not

fear the development of "acute dilatation" or "fatty heart" as among the perils of middle life. But a sudden increase in weight calls for heart care and for a prompt medical search for the underlying cause, in order to avoid the liability of heart failure.

THE INCEPTION OF BLOOD PRESSURE ELEVATION

Middle age is also the time of life when high blood pressures are rampant. Increased arterial tension (high blood pressure) is dependent upon several circumstances, including the force of the ventricular contraction, the degree of resistance in the arteries, the demands for a sustained circulation of the blood, etc. The physical and mental excesses of middle life intensify all of these phenomena and contribute to high blood pressure readings. High blood pressure is further discussed on page 164, being mentioned at this point as one of the conditions which middle age may initiate.

ANGINA PECTORIS IN EARLY MIDDLE LIFE

In the perilous forties are also often seen the first attacks of angina pectoris and coronary artery disease. The difference in these conditions is set forth on page 154; but at this point we may consider them as one and the same, to facilitate discussion.

Angina pectoris means literally strangling of the breast and is characterized by a sudden and violent attack of pain in the left chest, which causes a constriction as though the heart were seized in the grip of an iron vise. The angor is intense and the patient remains riveted motion-

less to the spot until the seizure, which is mercifully of brief duration, disappears. Of course, such an attack immediately makes a person seek medical advice and by proper living, heart care and the judicious employment of drugs subsequent seizures may not occur, or their anguish may be greatly minimized.

Angina pectoris is mentioned with the heart affections of middle age (rather than of later years when it most ordinarily occurs), in order to emphasize the point that probably sixty-five per cent. of the attacks of angina pectoris that appear in men who are in their forties result from sexual overindulgence. In men of sixty or over the usual precipitating cause of the seizure is mental effort or unaccustomed physical strain.

Therefore, men in the forties, at which age minute circulatory changes are taking place in every structure of the body, should not allow promiscuity and its libidinous urges to carry them to the extremes of gratification and performance, which in their younger years they may have accomplished without danger to their hearts. There is a time for all things. Excesses of any type may damage the heart and circulation in the perilous forties.

CHANGE OF LIFE

The change of life (i.e., the menopause) is due to a cessation of activity in those glands which are peculiar to woman. The cessation results in an imbalance of other glandular secretions, at times producing phenomena of the nervous system which, in turn, induce heart hurry, heart consciousness, heart irregularities and fading and flushing of the skin called vasomotor imbalance. The cir-

culatory disturbances usually disappear with the passing of time and rarely leave the heart with any permanent damage.

It is important during the climacteric, when heart sensations arise, to make sure that the menopause is not being credited with the production of heart symptoms or high blood pressure readings, which are actually due to neglected dental infections, tonsillar infectivity, sinus involvement, gastrointestinal disturbances and other similar causes which can harass the heart at any age.

SUMMARY OF THE HEART IN MIDDLE LIFE

To summarize: The heart in middle life is subject to the physiologic changes incident to the subsidence of glandular activation and to the circulatory changes induced by capillary shrinking in all bodily structures. These physiologic changes, in themselves, do not impose any heart loads of particular importance; but they furnish the background for definite heart trouble of any type, which frequently is brought on by the physical strain and emotional stress of middle age. Furthermore, owing to the background of beginning circulatory impairment, diseased conditions, otherwise unimportant occurring during middle age, are likely to have a damaging effect upon the heart.

Obviously then, to maintain heart health in the perilous forties, one should observe ordinary frugality in physical expenditures; one should cultivate tranquillity in the presence of mental storms and meet with dignity and poise all bombardments of the emotions.

THE HEART IN ADVANCING YEARS

When the perilous forties have been successfully navigated, the heart sets sail upon the more tranquil seas of advancing years. Through the sixties and into the seventies, the voyage customarily is quite free of perils for hearts that have been unassailed earlier in life.

At this later age the heart is hampered only by an intensification of the symptoms which accompany gradual and progressive capillary change. Therefore, one naturally moves a little slower, thinks a little longer, writes more deliberately, instinctively cuts down activities and voluntarily increases rest. One day a week in bed may be all that is necessary, in order to keep up and around. Excursions and vacations may make such demands upon the heart that several consecutive days should be spent in bed, in order to recuperate from the heart fatigue that comes from overspending. Attention to the general suggestions for heart care, as given in Chapter VIII, should maintain the mellowing heart indefinitely.

Persons who are in the sixties and whose hearts in earlier life have undergone battles with infections, which have marred their circulatory efficiency, are likely to develop anginal pains on the putting forth of unaccustomed physical exertion and when under sustained mental stress. These anginal chest pains should be regarded as friendly warnings that the limits of heart capability have been reached. Immediate cessation of the activities usually means immediate cessation of chest pain. There then should follow a period of rest in bed for one week or two, in order that the heart may regain the threshold of ef-

ficiency which it has lost. It is one of the blessings of advanced years that anginal pains at this time of life occur with less frequency, with less severity, are less likely to produce acute prostration and are never so fraught with dangerous possibilities, as when pains arise from the reckless and wasteful expenditures of middle life.

CHAPTER VI

SIGNS THAT MAY INDICATE BEGINNING HEART TROUBLE

The consciousness of some departure from customary health may be called either a sign or a symptom. Symptoms are warning signals along the highway of health.

Every organ and every structure can flash to the brain a number of signals announcing distress. The heart, in particular, is most alert in transmitting messages over various lines.

Affected hearts always give warning signs. It is inconceivable that an organ so vigilant as the heart, which patrols every second of life from the cradle to the grave, should fail to flash a signal that warns of threatened heart integrity.

True, an individual may be stricken suddenly with heart trouble; but the afflicted one on close questioning will almost invariably recall that in his heart he had experienced premonitory signs of distress. His intimate companions, moreover, will likely have observed minor departures from normal before the person was stricken; but the signs were regarded as unimportant by the man who thought that he was too vigorous or too busy to consult a doctor. Again, the symptoms may not have been located within the chest over the heart. They may have arisen elsewhere than in the heart and therefore may have been misinterpreted, being dismissed with a gesture of

inconsequence as only "a little rheumatism" or "a little indigestion."

Therefore, regardless of circumstantial evidence to the contrary, it can be asserted that heart trouble never produces sudden collapse without giving warning signs. Those signs are made manifest to the stricken person, to his intimate associates or to his doctor. While an attack on the heart may be sudden and unexpected, it is never totally unannounced.

Valuable, precious and at times life saving, heart symptoms should be regarded not with alarm, but rather welcomed as an opportunity to help a friend in distress.

Of course, a person who is medically untrained cannot possibly make a diagnosis of heart trouble from a symptom or two. The signs that may indicate heart involvement can be counterfeited by conditions located elsewhere in the body. Therefore, the diagnosis of heart impairment will be made by the physician after he has investigated the various symptoms of which the patient complains and has correlated them with the physical signs which he elicits.

Below are enumerated the symptoms which should take a person to the doctor to ascertain whether or not the sensations be of heart significance. They are arranged quite in the order of their frequency and importance.

Rapid, pounding heart
Tiring easily
Shortness of breath
Palpitation
Intermittent beats
Chest oppression
Gas pressing on the heart
Chest pain

Early limitation on effort
Head congestion
Mental sluggishness
Dizziness
Fainting
Cardiac asthma
Cough
Swollen ankles
Labored breathing
Blueness of the lips and face
Dropsy
Sitting up to breathe
Engorged and swollen veins

All of the above presenting symptoms of heart trouble can be caused by conditions elsewhere than in the heart, as hereinafter shown under separate discussions.

RAPID, POUNDING HEART

This symptom is nearly always due to mental or emotional excitement and also occurs in people of an apprehensive nature. Acute stomach upsets may bring on the condition, as may also fright and fear. Only on very rare occasions, in people who are definitely ill with acute infections, does a rapid, pounding heart mean that the heart, itself, has been invaded.

TIRING EASILY

Tiring easily should not be confused with the continually weary condition of persons in a chronic toxic state. And sheer laziness may seek an excuse in tiring easily.

When tiring easily is an early sign of heart impairment, the weariness comes on with the putting forth of physical

or mental effort. When the effort ceases and the person relaxes, the weariness disappears. The heart tires easily on moderate effort because of its inability to supply the skeletal muscles with the added supply of blood which muscular activity demands.

Tiredness that is confined to a group of muscles is usually toxic. Heart tiredness selects no one location particularly nor favors any one muscular group.

SHORTNESS OF BREATH

Shortness of breath is a valuable symptom of heart impairment and should always be seriously regarded until proved to be caused by other conditions.

To be ruled from consideration is the hampered breathing due to food sensitivity, acidosis, overeating, overweight, tight clothing, apprehension, anxiety, anger, emotional disturbances and hysteria.

There are also persons with some degree of oxygen deficiency whose full respirations are oppressed in close atmospheres, poorly ventilated rooms or in the presence of smells, smokes or gases. Such persons are often habitual "sighers", who indulge in deep and ostentatious respirations at intervals and this occasional "reaching for air" sometimes is miscalled shortness of breath and of course is without heart significance.

In the above instance, the shortness of breath arises only in the presence of the exciting circumstances. It bears no direct relation to effort, physical or mental. There is no feeling of general bodily tiredness.

When shortness of breath is of heart origin it is quite

invariably an accompaniment or immediate sequel to effort. It is likely to be attended by a sense of bodily weariness that is out of all proportion to the effort put forth and, in severe instances, may amount to bodily fatigue. Furthermore, when heart embarrassment induces shortness of breath, it is constant in recurrence on similar effort and it likely will gradually increase in severity with each repetition of the act.

The provocative effort can be some accustomed exertion, such as climbing stairs or carrying a suitcase. In other instances, such ordinary circumstances may not be considered of any importance until the person later recalls them as having been premonitory signs that preceded some acutely prostrating burst of energy or sustained physical output which precipitated an attack of shortness of breath.

PALPITATION

Palpitation may be defined as a rapidity of heart beat of which the person is uncomfortably conscious. Palpitation is a term improperly used to describe the impact of an overacting heart, or the widespread beating of the heart within the chest when under emotional tension. The term also may be employed to describe a dropped beat or intermittent pulse.

People who have a genuine heart affection very rarely employ the word palpitation. They are prone to study out other expressions that more exactly describe the sensations and reactions created by the malady within their chests.

INTERMITTENT BEATS

Intermittent beats often are spoken of as "heart thumping," "heart turning over in the chest," "dropped beats," extra systoles or premature beats. The sensation is alarming when first experienced, but is not a sign of immediate heart danger. The occurrence of an irregular beat is reason sufficient for a heart investigation and the subject is discussed further on page 14.

CHEST OPPRESSION

A sensation of tightness in the chest can so obviously be due to a lung or thoracic condition that these pulmonary sources will be excluded by the physician before attributing the sign to heart impairment. When the heart is basically affected, effort induces chest tightness; and the tightness ceases when the person rests, with early recuperation following. When lung structure is involved, the distress is quite unrelated to effort and drags along indefinitely.

GAS PRESSING ON THE HEART

Chest oppression that is relieved by belching, or by the emitting of flatus by the bowel, is so obviously related to gastrointestinal disturbances as to be universally regarded as "only a little indigestion." This is the most monumental mistake that can be made, particularly when any degree of physical prostration attends the "gas oppression."

The eating of rich, incompatible foods, the overeating of any food at irregular hours, the eating of the most sim-

ple food when weary or physically engaged, all tax digestion. And the heart pays the tax.

Digestion is dependent upon the presence of digestive juices. The secretion of digestive juices is dependent upon an adequate blood supply to the organs of digestion. If the blood distribution is not sufficient on account of a failing heart, then reduction in digestive juices means food fermentation and the formation of "gas." Belching of gas only relieves the heart oppression; it does not lighten the load of the laboring heart. The older the patient, the greater the possibility that the ageing heart may show its first signs of failure in the symptoms of "indigestion."

CHEST PAIN

Persons quite generally confound chest pain with heart pain. There is a vast difference between genuine heart pain and the counterfeit chest pains induced by neuralgias, muscular sprains, rheumatic twinges and abdominally referred pains that so often alarm people as to the integrity of the heart.

The minor chest pains above mentioned are likely to occur during epidemics of influenza and common colds. They are acute in onset, unrelated to effort, often variable in location, sharp and lancinating in character, brief in duration, superficially located and usually can be reawakened into fleeting sensitivity by such simple maneuvers as making pressure, shifting posture, reaching or stretching. These extra-cardiac conditions are never accompanied by signs confirmatory of acute heart impair-

ment nor by gastric symptoms, unless of course heart hurt or digestive disturbances existed prior to the chest pain.

Genuine heart pain, on the other hand, is precipitated by effort—physical, mental or emotional. While it may strike suddenly, it is not likely to be a stabbing or piercing pain, being often quite dull, deep seated and possibly vise-like, enduring for a variable time and gradually diminishing. Occasionally, there are exacerbations brought on by the same circumstance that induces the vast majority of genuine heart symptoms—effort of some type.

EARLY LIMITATION ON ACCUSTOMED EFFORT

Early limitation on accustomed effort may be of a mild degree that indicates heart involvement at a remediable stage. Among these minor limitations, a person may find that he recently has become habitually short of breath on climbing long practiced stairs; or he may tire regularly before reaching the top of a familiar incline. The housewife may observe that she is not able, as formerly, to sweep and dust a room without brief intervals of rest, and is no longer able to stoop without incurring distress. Or elderly persons may find that on walking in the face of a wind they develop shortness of breath.

Unfortunately, such early heart protests as the above are not accorded the respect which their importance deserves. And it may be discovered after the passing of months that the innocent symptoms have so increased and accumulated through neglect that a mild degree of heart failure ensues.

Among the more advanced signs of effort limitation, sudden arrest of motion naturally casts suspicion on the

heart. Before the heart flatly refuses to support a person's movements, there are always warning signals of impending imbalance, then perhaps collapse and prostration. There also are minor warning signs, such as the vessel spasm of a leg, which is called intermittent claudication, where the instant collapse of a group of leg muscles precipitates a person to the ground.

HEAD CONGESTION, MENTAL DISTURBANCES, DIZZINESS AND FAINTING

Head congestion, mental disturbances, dizziness and fainting of course may be attributed to unnaturally high blood pressure, to deficient oxygenation of brain tissue arising from an insufficient circulation and to disturbances of blood balance in the circle of Willis at the base of the brain. The four symptoms also can be caused by ear conditions, intracranial growths, brain abscesses and meningitis. Headaches arising from these and a multitude of other causes must be diffentiated from the headache of circulatory origin that so often accompanies elevated blood pressure readings, and from the head pains that are due to a diminution of blood supply to the brain brought about by a failing circulation.

Fainting is comparatively rare as an actual heart symptom. Of course, persons who faint at some mental shock, at the sight of blood, through sheer hysteria or as a result of epilepsy, nervous derangements or brain conditions naturally will call their hearts into question as possibly inducing the symptom. But when fainting is of true heart significance it may be expected to occur in connection with a slow pulse rate or with an unusual form

of breathing, which ranges progressively from a diminuendo to a crescendo pitch, remaining silent for an interval, then again beginning an ascent from the bottom of the scale (Cheyne Stokes respiration).

Fainting also may occur in obese persons with impaired hearts or blood vessels, when the abdominal aorta is compressed, as in stooping to the floor, sitting in a bath-tub or straining at stool. Persons with weakened hearts may faint in bathrooms as a consequence of taking drastic cathartics which suddenly evacuate the bowels, thereby removing support from the blood vessels throughout the intestines, which probably results in a withdrawal of blood from the brain, and fainting ensues.

Akin to fainting is a temporary sense of remoteness, a feeling of dissociation from the surroundings. Not swooning nor dreaminess, for the perceptive faculties are consciously struggling to comprehend. Persons have difficulty in describing this far-awayness, this inability to make a close-up contact with objects and ideas; it is a transient haziness of mental awareness. When this dulling of awareness is not attributable to fatigue, brain fag or drug taking, it is a symptom of vasomotor imbalance in the young. In older persons it is indicative of diminished circulatory efficiency and is likely to be associated with a marked fall in blood pressure from what had been the person's customary readings.

DISTRESSED BREATHING OF HEART ORIGIN

Night attacks of chest tightness with shortness of breath, which awaken a person from a sound sleep, are of profound heart significance. The condition sometimes is

called "cardiac asthma." At the inception of such attacks the heart may be only slightly affected; it probably will become seriously involved should the early signs be neglected.

A person with cardiac asthma awakens from a sound sleep to find himself breathing laboriously, with a sense of suffocation and chest oppression, but with no pain of particular importance. The sitting position commonly relieves the asthma after several minutes.

COUGH

Cough is a symptom of a multitude of abnormal conditions, including circulatory impairment. The classical "heart cough" of course is a manifestation of lung congestion due to a failing circulation and is provoked by effort.

One or two shallow, abortive, unproductive coughs in many persons are associated with the occurrence of a premature beat, the cough arising at the moment of "clutching" in the left chest and coincident with the irregular beat,—probably a pneumogastric nerve reflex.

A chronic winter cough in ageing persons is not always due to bronchitis. Often it is an evidence of sub-acute heart failure and of a circulation that cannot withstand the rigors of Winter's chills and blasts.

SYMPTOMS OF CONGESTIVE HEART FAILURE

When a heart affection advances to a stage where circulatory efficiency breaks down, water from the blood accumulates in various bodily tissues and this accumulation of fluid is called congestion. The heart has failed to

maintain the circulation and congestion has resulted,—congestive heart failure.

Swollen ankles, labored and forceful breathing, blueness of the lips and face, dropsy, sitting up to breathe (orthopnea) and engorged and swollen veins usually are signs of actual organic heart impairment of the congestive type. People with such symptoms already know that their hearts are affected and have been under medical care for some time. So a consideration of these conditions as signs that should take a patient to his doctor need not detain us here. However advanced such symptoms may be, there always is the happy prospect that with continued rest, heart care and medical supervision the general health may be so benefited and the heart impairment so improved that the patient can anticipate at any time a more fortunate turn in the tide of his affairs.

THE AVENUES OF MEDICAL APPROACH

Being now acquainted with the symptoms—that is with the unusual sensations—that should take one to the doctor, the reader will be further interested to know of the avenues of study and investigation by which the physician arrives at a diagnosis of heart trouble.

Granting that the complaints implicate the heart, other testimony must be adduced to corroborate the symptoms, including a survey of the patient's previous history, family history, occupation, habits, physical examination of the body from head to toes and blood pressure estimates.

When the findings along such lines of inquiry confirm the doctor's suspicion of heart involvement, further studies

of a special nature are indicated. Indeed, even though the physical findings are negative and flatly at variance with the individual's complaints, the patient will receive the benefit of any doubt and further corroborative examinations will be considered as follows.

A cardiogram (heart writing) is indispensable in any modern heart examination. This literally is a message from the heart, written by the heart itself, through the instrumentality of a very elaborate scientific apparatus. While the patient sits relaxed and comfortable unaware of the proceeding, the delicate instrument records on a moving photographic film every tiny transaction that takes place in a heart beat—in hundreds of beats. Thus the heart delineates its own story of normality or impairment in terms incontrovertible.

The clinical laboratory may be requisitioned to give additional information that will clarify the situation of the heart. A blood count, for example, may reveal an anemia that is depriving the heart of nourishment. The blood picture may confirm the suspicion of focal infection. Blood chemistry studies also may be desired by the heart examiner in searching for diabetes that often causes hearts to beat very rapidly. Or the blood chemistry may indicate that too much waste products from the overeating of meat are being retained in the body and possibly acting as a toxin on the heart. Furthermore, there may have been something in the heart's behavior or in its sounds that makes the laboratory test for syphilis of profound importance. A urinalysis may give information as to whether the kidneys are defective in eliminating

waste matter, thus throwing the load of retained poisons on the heart.

Thus the doctor will decide, as his examination of the patient proceeds, just what supplemental examinations are necessary to establish not only a heart diagnosis, but also to indicate appropriate treatment along other lines that will indirectly benefit the heart.

X-ray studies of the upper and lower jaws are so important in appraising the heart that no heart examination can be said to be complete that does not include x-ray study of the root ends of teeth. X-rays of the heart and great blood vessels also may be indicated. It all depends on what the doctor finds in his preliminary inspection of the patient.

Maybe other special opinions, as those of a nose and throat specialist, an eye physician, a surgeon, a stomach specialist or a gynecologist, may be desired.

Of course no one person will ever require all of the special studies above enumerated. They are set forth here, in order to indicate the avenues of inquiry and research that may be necessary to identify the cause of heart disturbances. The heart is more sinned against than sinning. The very multiplicity of avenues which may be patrolled in a search for the hidden cause of heart impairment, multiply the hopes which a heart patient may embrace for ultimate deliverance from the bondage of heart harassment.

CHAPTER VII

THE USE AND ABUSE OF HEART REST

Rest is of such transcendent importance in heart care that it completely overshadows all other remedial measures. Such importance entitles the restorative, rest, to a prominent place in any consideration of heart care. Hence, a special chapter appears at this point where the reader may make an early acquaintance with rest and apply its principles to the consideration of his own condition as he follows along with subsequent chapters on the prevention and reconstruction of heart impairment.

Rest is the most valuable and dependable remedy on earth for hurt hearts. If rest were a prescription that could be compounded by an apothecary and dispensed in convenient tablet form, most of the heart drugs now in vogue would gather dust on the chemists' shelves.

REST AT HOME VERSUS INSTITUTIONAL CARE

When a heart patient enters upon a period of rest the question often arises whether the rest shall be undertaken at home, in a hospital or in a sanitarium. Frequently the initial heart impairment is so prostrating that the moving of the patient cannot at the moment be considered. But when the nature of the illness allows time for deliberation, the questions to be considered include; is an operation contemplated later on, which will relieve the

heart of load when the patient is stronger? Is a physician readily available at home and is skilled and constant nursing attention at hand for emergencies? Is the neighborhood conducive to quiet and rest? Is the atmosphere of the house distracting and annoying? Is the illness of such a type that the patient may be entertained and diverted by familiar surroundings? Is he persnickety about his food and its preparation? Is he likely to be lonely in a strange place?

If the answers to these inquiries are in favor of rest at home, then the rest period should by all means be instituted at home. Heart patients by and large do infinitely better in their accustomed surroundings.

The treatment of heart conditions at health resort hotels, watering places and foreign spas is so obviously directed to the relief of chronic heart impairment that a recital of their advantages here need not detain our discussion of the home treatment of acutely ill hearts.

NURSING CARE

A person who is undergoing heart rest requires nursing care. Nursing a heart patient demands trained experience, tact and resourcefulness.

Members of the family are often reluctant to yield to an outsider the care and attention which family devotion would heap upon the invalid. But it is very seldom, if ever, that the best interests of the patient are served by the attentions of one with whom he is too well acquainted. Thus control of the invalid is often lost. And the apprehension of the attending member of the family, should an emergency arise, not only taxes the forbearance and preys

upon the sympathies of the patient, but may even alarm him. Furthermore, members of the household should be free to come and go in their accustomed routine and thus be diverted from the inevitable strain of attendance in the sickroom.

A graduate nurse is the doctor's medically trained associate—not assistant—in the treatment of the patient. Records must be kept of the temperature, pulse and respiration; of rhythm vagaries, volume variations, color changes, character of the breathing and many other observations that might escape the untrained eye and uninterpretative mind.

Diet, baths, massage, medicaments and other remedies must be administered as the doctor orders, but not always with the machine-like precision and regularity of an unthinking automaton. It may be necessary to change some instructions as varying circumstances arise. The trained nurse must ever be alert and resourceful. That is why she was trained.

What are the minor duties of a nurse? Keeping the room in order, regulating heat and ventilation, avoiding drafts, changing the bed linen, freshening the pillows, preparing tempting dainties in the kitchen, assuming a censorship over many outside communications with the patient, regulating the number and variety of visitors, telephoning the doctor—each day a nurse does these and a hundred other little skilled practices that smooth the path of recovery. Always she looks out for the best interests of the patient; she is a sympathetic friend and confidant—never a jailer.

Above all, should an emergency arise, the trained nurse

is expectant and prepared to administer emergency remedies, thus perhaps sparing the patient many precious moments and subsequent tedious hours.

The heart nurse should be quiet, entertaining and cheerful, even to the point of gayety. Animation and laughter are an asset in the sickroom. And the well trained nurse is as engaging in proposing diversions as she is efficient in performing her duties.

OBJECTIONS TO REST

Rest, as it must be administered to heart patients, sometimes may meet with objections. It is unpopular with some on account of its inconvenience and because of its interference with the individual's accustomed daily practices. Furthermore, the duration of the rest period is often indefinite and may seem interminable to impetuous persons, who avow they cannot afford the time for rest. There is a third possible objection to physical rest. Like other valuable remedies, it often is abused by being used in excessive dose. Physical rest is good for some hearts; physical exercise is indicated for others. The remedy must be thoughtfully applied to suit the individual requirements of every patient.

Patients would be more favorably inclined towards rest, if there were a better understanding of the different types and degrees of rest.

The types into which heart rest can be subdivided are three: physical, mental and emotional. These three types can be employed in degrees classified as follows: Absolute or complete rest, partial or convalescent rest and modified or periodic rest. The application of the princi-

ples of heart rest can be set forth in a few concrete illustrations.

ABSOLUTE REST

Absolute heart rest means that the patient shall be in bed flat on the back, with head comfortably elevated, totally absolved from customary responsibilities, business cares and social demands. The patient is to be under constant nursing care, so as to be spared even such a trivial effort as reaching for a glass of water. To secure rest for the mind and emotions, it may be necessary to administer simple sedatives until the patient's philosophy asserts itself and he voluntarily abandons worry and anxiety.

Absolute rest admits of no compromise with its absoluteness. The caprices, preferences and whims of the patient for the time are not to be considered, on account of the serious conditions in which absolute rest is ordered, such as the sudden and severe chest pains and acute prostration that usher in acute coronary artery obstruction. Other conditions where quiet and stillness are paramount include infarctions, emboli or clots and the threatening rupture of arteries in the brain. Absolute rest is further employed when acute diseases threaten to overwhelm the heart. It also is employed for progressive heart muscle weakness that fails to improve under less rigid rest requirements.

Physicians when they first see a heart patient are quite likely to insist on a period of absolute rest for a few days. This does not mean that a serious heart condition is present or even anticipated. Quite on the contrary, the in-

stitution of an initial period of absolute rest is excellent medical practice. It permits the doctor to note the benefits accruing from rest alone; rest may be all that is necessary. Thus large initial doses of heart drugs, which are often used in persons who are up and around, may perhaps be dispensed with when the body is at physical rest. The heart's power of self-recovery is thus determined and that information will be of value in the future guidance of the patient.

When patients are ordered immediately to bed, they often ask why rest is to be so absolute and why their restrictions are to be so arbitrarily enforced. The reason is obvious. Absolute rest is insisted upon, in order to save heart beats. That is the only way the heart can rest, in the interval between pulsations; decreasing the number of beats, increases the heart rest. Even a perfectly well heart will pulsate eight or ten times less a minute when a person is lying down. As far as mental rest is concerned, it is well known that emotional concern will speed up the heart rate ten or twenty beats per minute.

Therefore, if by resting, the heart saves ten beats per minute, in an hour it has saved six hundred beats and in the sixteen hours that a person is ordinarily up and around, the resting heart will have saved the unnecessary expenditure of about ten thousand beats a day. A tired or impaired heart will save perhaps two or three times that number of pulsations when the patient is resting, to say nothing of the lesser degree of heart strength required in propelling the blood through vessels that are on a flat plane, rather than through vessels that are perpendicular.

A tired and aching arm is put in a sling for weeks at a

time, in order to rest and regain its function. The heart cannot take such an extended holiday from its necessary duties and therefore must be put at rest in bed to avoid as much unnecessary work as possible.

Therefore, when a physician instructs a patient to go to bed for a few days while the heart is being studied, he has three objects in mind. First, he wishes to study the natural recuperative powers of the heart under rest alone, without the administration of drugs that control the rate. In the second place, when the patient is studied under such a favorable circumstance, the doctor can better evaluate the drug and the dosage that will be required when the patient is again up and around. And in the third place, during the examination the doctor may have observed certain signs which lead him to believe that further trouble is impending, which possibility may be averted by a few days rest in bed.

PARTIAL REST

Partial or convalescent rest defines the limited activities which are allowed to patients who are progressing from an initial period of absolute rest, at which time the heart was either acutely involved or its integrity threatened.

Partial or convalescent rest begins with sitting up in bed. Further effort may be gradually assumed from day to day over a period of three weeks until the patient is able to walk outdoors. Convalescent rest terminates when the patient is outdoors and on his own.

These gradual steps, by which the once affected heart is reeducated to a natural rate response and to the full sus-

taining of the individual's daily life, are set forth in detail on page 178 and require no further elaboration here.

MODIFIED REST

Modified rest is very sensibly employed by former patients who have regained a degree of heart efficiency. The regained heart strength is fully sufficient for customary activities, but former heart patients should feel that it is prudent to conserve heart efficiency by some such measure as spending one day a week in bed or one day in loitering about one's room, not engaging in physical effort of any type and avoiding business connections and callers.

Adoption of a noonday siesta is another wise employment of modified rest, and should be indulged in not only by former heart patients, but also by every person who is interested in the conservation of heart health. The spending of half an hour after luncheon reclining on a couch takes the strain of the upright position from the blood vessels and seems to maintain one's general efficiency throughout the dragging hours of the late afternoon.

THE ABUSE OF REST

As with any other potent remedy, rest can be administered in overdose to the detriment of the patient.

For example, a person may be obsessed by the fixed idea of perpetual heart trouble and through fear of its aggravation that person will avoid all effort as far as possible. Perhaps what was thought to be a heart impairment, was nothing more than the heart protesting against the repetition of a faulty habit, such as overeating; but never-

theless, through unnecessary concern, the heart is guarded against the putting forth of physical effort. A heart thus maltreated by too much rest soon becomes sluggish and so inefficient as to make the patient weaken and fatigue on the slightest exertion. Rest in such an instance is administered in overdose. What such a heart requires is the correction of a faulty habit or circumstance that caused it to protest, after which exercise, and plenty of it, should be adopted to maintain a high level of heart health.

Another illustration shows that rest may be too long continued following a heart illness. A patient who had fully recovered refused to take up exercise. This refusal probably caused the heart to drop beats. The heart evidently had not sufficient contraction force to thoroughly empty its muscular fibers of the toxins that accumulate in all muscles which are exercised insufficiently. Thus the toxins of inactivity could have caused the heart irregularity. Be that as it may, following the adoption of customary exercises, the irregularity completely disappeared and was not again noticed.

Indeed, it not infrequently happens that physicians must order a heart patient to leave bed and be up and around. The heart is not the only factor to be considered in convalescence. There are many other organs and muscles that require employment at intervals when they are not sharing the periodic holidays of the heart.

The reader by this time will have asked himself at just what point is heart rest supposed to terminate and exercise to begin. No line of demarcation can be established. It is the proper interweaving of rest and exercise

that constitute the warp and woof of the heart's fabric in health. When the heart is acutely ill, rest is paramount. As the heart recovers, exercise must be gradually introduced and increased as convalescence advances, if that heart is ever again to become strong and efficient.

CHAPTER VIII

GENERAL SUGGESTIONS FOR HEART CARE

Hearts are hurt in four principal ways. A person need only to search along these four avenues to find the cause of heart trouble. When the cause is thereby identified, care and treatment will either minimize or correct the heart's impairment.

The four principal sources of heart hurt are as follows:

First, by the diseases of childhood which may directly invade the heart during the acute stages or so strain the organ that the impairment comes to light in later years.

Second, by diseases that occur during adolescence, including focal infections, or by the thoughtless physical expenditures of youth. Either one may affect the heart acutely at the time or the heart impairment may lie dormant for years until some strain of later life precipitates heart embarrassment.

Third, by the appearance at middle age of gradually developing diseases that may have been quiescent and unsuspected for some time, such as diabetes, anemia, tuberculosis or syphilis. But in middle life the heart is affected principally by the excessive physical demands and emotional intensity that characterize this age period and which break down a circulatory apparatus that is being actively impaired by retrogressive changes in the capillary blood supply.

In the fourth place, when there is nothing in the past medical history that can affect the heart; when in the present there is no hidden focal infection or constitutional disease discoverable, then it is probable that heart harassment may be brought on by faulty habits or by unconscious errors in daily living, including exercise, rest, diet, hygiene and personal habits.

The first three avenues of heart hurt have been discussed on previous pages. This present Chapter deals with the fourth source of heart impairment and aims to make general suggestions that will order one's daily life along constructive lines of heart care, whether one be a former heart patient or a healthy individual interested in the preservation of heart integrity.

MORNING EXERCISE

Some persons are so constituted muscularly that they are invigorated and benefited by indulging in setting-up exercises on arising. Other people find morning exercises not only distasteful, but actually enervating. A third group will find sufficient muscular activity in hustling about the affairs of their business day. Still others will be so employed in an actively intellectual capacity that such intensive exercising of the mental muscles produces a general fatigue that precludes the calisthenic employment of skeletal muscles.

So calisthenics do not produce in everyone the "beautiful strength" of the Greek from which the word is derived. Therefore, each person should consult his inclination and urge as concerns morning exercises. Calisthenics can neither particularly contribute to nor detract from

the heart health of a person who is up and around, unless indeed it be that repeated bending, stooping and twisting may produce faintness and dizziness through a temporary circulatory imbalance.

BATHING

A morning bath and vigorous rubdown is an excellent start for the day. The water should be comfortably tepid, not hot nor cold. Dashes or showers of cold water unnecessarily stimulate the vasomotor nerves and the capillaries of the skin. They should be indulged in only by vigorous persons in whom follow healthy reactions to the shock of cold water.

STAIR CLIMBING

Going up stairs is usually the first of our accustomed efforts that draws attention to the heart. Unusual fatigue at the top of the flight or shortness of breath on completing the climb are significant heart signs when they occur repeatedly or persistently.

Manifestly, racing the stairs, trudging upwards with heavy loads, or climbing after a full meal will induce a perfectly natural shortness of breath in the best of hearts. Natural and healthy hearts have a reserve that makes them unconscious of stairs. The response is different with an ailing heart, for its reserve force is reduced by the affection. Consequently, such hearts protest under the necessity of ordinary unencumbered stair climbing.

Suppose an average adult man, weighing one hundred and sixty-five pounds, is ascending the stairs. With each step he lifts those one hundred and sixty-five pounds

eight inches into the air on one leg. If there are twelve steps in the flight of stairs, on reaching the top effort has been put forth equivalent to hoisting one hundred and sixty-five pounds to the heighth of eight feet. The heart furnishes the motive power for the lift. That is exhausting work for a tired heart. What an ideal way to perpetuate a heart weakness, this climbing of stairs!

The rate of any healthy heart will increase ten or fifteen beats a minute on one flight of stairs. Healthy hearts will return to the pre-exercise rate within a few seconds; but affected hearts will maintain the exaggerated rate for several minutes after effort ceases. It is heart beats that a heart patient must conserve. Why spend five hundred or maybe one thousand beats unnecessarily in the act of climbing stairs?

Stairs are not always avoidable. A heart patient who must perforce climb stairs can minimize the possible ill effects by a slow and deliberate ascent and by pausing on both feet at every fourth stair and taking four deep breaths before resuming the mount. Through continual practice of such graded climbing the ascent is often accomplished without distress. The banister always should be used, so that the arm and shoulder muscles share the load and facilitate the lift incident to a climbing of stairs.

CONSERVING OCCUPATIONAL HEART EXPENDITURES

Daily occupation affords many opportunities for reducing unnecessary heart expenditures. Among these are such frequently overlooked conditions as **ventilation, fresh air** and **light**.

Ventilation has to do with the carrying off of fumes incident to processes of manufacture or to close quarters. Fresh air has to do with the purity of oxygen supply. A window can always be opened to some extent above or below and exposure to drafts can be avoided. Light at one's occupation saves the eye strain of concentrated vision, and eye strain, long continued, can exert a nervous reflex on the heart's behavior.

At daily employment, one should avoid bursts of speed, as in racing the stairs or running from one department to another. The constant lifting of heavy objects may induce heart strain, as may also reaching overhead in the act of operating levers. Occupations that require one to be continually on the feet are likely to cause heart protests.

THE NOONDAY REST

A noon rest of half an hour in a reclining position, either tilted back in a desk chair or stretched out full length on a couch, where one may be mentally composed and physically relaxed, should be a routine procedure. In foreign countries the noonday rest is almost a ritual of business. When the surroundings can be quiet and the mind unoccupied, the rest is more beneficial.

The noonday siesta for a time relieves the heart and blood vessels of the strain of supporting the circulation in an upright posture, and surprisingly conserves energy for the afternoon work.

OPEN AIR RECREATIONS

There is nothing fanciful about the circulatory benefits conferred by exercise under the open sky. Sunlight is a

stimulant to the capillaries of the skin and a rich source of vitamin supply. Oxygen from fresh blown breezes adds to the stores of that life giving gas that is carried by the hemoglobin of the blood to the remotest cells of the body. Open air exercise further quickens the pulse and energizes the heart. All of these benefits conferred by the great outdoors create the physical vigor and mental alertness that is called the glow of health.

It matters but little what form one's open air recreations may take, as long as the activities impose a fair amount of muscular exertion. Walking, swimming, riding, fishing, hunting, golf, tennis and quoits are all desirable. Even the popular pastime of sitting on ball park bleachers, shouting approval and gesticulating disgust over the plays and players, has sunshine, open air and exhilaration to commend it.

GOLF

Golf is Nature's triumphant response to the demand of modern life for outdoor diversion.

With everything under the sky to commend it and with enticements all its own, golf stands preeminently the most alluring of heart building recreations.

The popular appeal of golf, however, in nowise warrants the assumption that the game is universally adaptable to every person. Nor does the brimming enthusiasm of its devotees establish golf as a diversion that should be followed with impunity by every individual who seeks health and vigor.

Speaking from the standpoint of heart protection, there are certain restrictions and even prohibitions to be im-

posed on the playing of golf. These heart born inhibitions apply to men of middle age. First, to the one who has never played golf, but who contemplates adopting the game and, secondly, to the man who has always played it.

A person who has recovered from a heart affection and who has never played golf, should not adopt the game as a health measure. The reasons are obvious. Middle aged muscles are no longer supple. The body no longer has the agility and lithesomeness of youth. The flexibility of motion and the grace of movement, which successful golf form requires, are beyond the physical attainment of middle aged musculature.

Therefore, to the middle aged initiate, playing at golf may become a physical burden and a continual muscular strain, as the novice goes through the heart threatening motions of stretching, straining, swinging over shoulders and twisting in an effort to acquire the necessary good form stroke, without which the player becomes a dub. Such performances cannot possibly add to the strength of a once affected heart, be it still impaired or fully recovered, at middle age.

Judgment and common sense allow no other conclusion than this; the ex-heart patient of middle age or past should not take up golf as a health building diversion.

On the other hand, suppose that a person has played golf for years, having acquired his form when the muscles were supple and tractable, only to have his practiced performances interrupted by an intercurrent heart illness; should this experienced golfer after his period of heart convalescence return to the links?

By all means the practiced golfer should return to the

allurements and enticements of his old game following a heart illness. He should return whether the heart has entirely recovered or whether it remains to some degree impaired from the illness. But on the links henceforth when using his clubs to protect his wager, the golfer also must use his head to protect his heart.

A few cautions are necessary at first. The practiced golfer's former efficiency at the game must be voluntarily cut down to fifty per cent. when he first returns to the links. The walking distance from one green to another should take twice as long and every opportunity should be embraced at each hole to rest for a few moments.

A golfer who has had heart trouble should not go to the links on windy days and should not play on hilly courses. When the shots exasperate him to the point of developing irascibility and to displaying temper, the heart hurt golfer without further ado should call it a day.

Above all, the man with a one time heart affection, who later returns to the links, should direct and govern his play by eternally bearing in mind **The Heart's Exercise Creed.**

Effort must cease when it brings on heart hurry, shortness of breath, chest oppression, chest pain or physical fatigue.

The heart's exercise creed should govern the world of sports for every player from croquet to big game hunting.

So play, golfer, play—but only to your heart's content.

COMPETITIVE SPORTS

Competitive sports and games that require physical exertion should never be entered into by a person who is

approaching middle age, regardless of the state of health. Competition and the spirit to win will often carry a person beyond that point of exertion where beginning fatigue ordinarily would cause one to desist. Thus heart hurt may have its inception in competitive sports.

Of course, there can be no objection to old friends of the tennis court engaging in a contest, when it is understood that either player is privileged to abandon the exercise in event of it setting in motion the sensations of heart protest as already set forth above under The Heart's Exercise Creed. But no matter how proficient a man may be, after middle age he should no longer indulge in wrestling, boxing, competitive swimming, handball, volleyball or squash. Most particularly he should not play on a competitive team.

SOCIAL DIVERSIONS

Persons who are exercising heart care, frequently ask what their attitude should be towards social diversions, such as dancing, card playing and theatre going.

Indulgence in such pleasures, and they should not be essayed unless they actually are pleasures, quite depends on how the previous part of the day has been spent. An afternoon in the open, which has entailed considerable physical exercise, should not be followed by dancing or card playing. That evening might be given over to the relaxation of a concert, a lecture, the theatre, a cinema or to quiet reading at home.

Advance preparations should be made for an evening of dancing or card playing by spending the afternoon in quiet pursuits or in resting in anticipation of the physical

demand of dancing and the mental stimulation of card playing, both of which often extend into the morning hours. A person logically would stay in bed for a longer time than usual the morning following late evening hours. Thus any social diversion can be prepared for in advance and later compensated for by rest and composure.

Social demands that are made on women can be so various and frequently repeated as to be almost incessant. As a result, physical weariness, heart fatigue and often heart exhaustion are the penalties paid for such unnecessary dissipation of hours that should be spent in solitude, tranquillity, relaxation and recuperation.

One of the very first things to be done when a woman is anxious to regain nerve stability and heart efficiency is to peremptorily resign from at least fifty per cent. of the multiple heart besetting memberships in women's clubs, village improvement societies, church auxiliaries, hospital committees, bridge clubs, literary societies and charity organizations. The modern woman would have nerves that were more composed and a heart more tranquil were she to follow her grandmother's fireside example and attend to her knitting.

EMOTIONAL TRANQUILLITY

The heart invariably participates in the action and reaction of contention and argument, jealousy and envy, resentment and anger, quarreling and fighting. Not infrequently one of these ungoverned mental attitudes is the exciting and immediately precipitating cause of acute heart prostration. Indeed, actual heart failure may promptly en-

sue in persons who are known to have heart trouble and who easily lose their tempers.

Calmness and mental poise are most essential for the perpetuation of heart health. Tranquillity is one of the most beautiful of words and one of the most beautiful of human attributes. It implies the possession of a mind, heart and soul in peace. When building for circulatory integrity, one cannot better order the days than in the cultivation of Tranquillity. An hour a day spent in solitude and self communion is an excellent way of acquiring Tranquillity.

CONCERNING FOOD

People often ask "what is the diet for heart trouble?" If by diet is meant some rigidly imposed restriction of variety in food, or if diet implies a fanatical devotion to one variety of food, such as fruits alone, leafy plants alone or the exclusive ingestion of only dairy products, then there is no diet for heart trouble.

True, the heart patient frequently benefits from a few days' adherence to one of the restricted diets just mentioned. He benefits because, with the balance of humanity, he requires an occasional digestive holiday.

Heart trouble often means digestive disturbances. Digestive disturbances often mean heart trouble. When we rest one organ, we rest the other. And rest benefits both.

To imagine that the human family at large can subsist indefinitely at a high level of health on a perpetually restricted variety of food is but a food faddist's fallacy and contrary to the aggregate of all human experience.

So let us discuss in a rational and dispassionate way various food suggestions for heart health.

First of all, let it be understood that the food suggestions hereinafter stated are for the maintenance of heart health. The suggestions have nothing whatever to do with persons who have stomach trouble, intestinal derangements, deficiency diseases, malnutrition, kidney complications, diabetes or other abnormal conditions, which require strict medical regulation and restriction of food intake. These pages speak of food suggestions only for heart health.

FOOD IS A REPLACEMENT MATERIAL

Man lives in a vast chemical storehouse called the body. The wink of an eye—the flash of a thought across the brain—of necessity destroys in passing some tissue chemistry.

Each and every heart beat consumes an iota of calcium, sodium and potassium. Then the stores of the body must be drawn upon for the next heart beat. And thus this interchange of chemistry continues throughout the hours and days, into the years that constitute the span of life.

How are these chemical wares replaced in the body's storehouse? By food, principally; although, of course, water, air, exercise and rest are essential components of the interchange of living tissue chemistry. Totally deprived of any one of the five we die. Food is the principal avenue of human chemical replacement.

Man, reduced to the ashes from which he came, materially is composed of some twenty minerals and chemical constituents,—for example, calcium, sodium, potassium,

magnesium, iodine, copper, gold, silver, iron—enough of iron in the body, it is said, to construct a lath nail. As man lives—as he moves, breathes, thinks and otherwise functions—he burns up his supply of these twenty some elements. The supply must be replaced by food. No single food contains all of the replacements that man must have. Therefore, the human family requires a variety—a vast variety—of food.

See how irrational it is to assume that poor health is due solely to a calcium deficiency and therefore to employ a diet of only salads and milk on the theory that these foods are rich in calcium. Equally absurd is the fanatical premise that every human must eat plentifully of raisins, regardless of the fact that they are so often indigestible, in order to replenish the body's iron supply.

Most food fads are equally fallacious. When a person is in poor health, who is to decide that the ailment is due to a deficiency of one certain chemical element? Surely not the food fanatics, nor yet the man on the street who is following a fad and who never felt better—no doubt because he for the time being is enjoying a digestive holiday.

CONCERNING VITAMINS

People who have maintained their health for years on a rational and balanced diet should pay but scant attention to the voluble vitamin vocalist, who is a walking dictionary of all the vitamins from A to Z and who claims to know what particular letter of the alphabet is lacking in a person's constitutional makeup.

Not that we should disregard vitamins,—no indeed;

simply that we should not attempt to identify and count them in our daily food. The word vitamin should be interpreted as indicating a vitalizing substance from vital foods and as such of course should be held in high regard. This means that the meats, starches, vegetables and fruits must be fresh, not devitalized by the processes of preserving and canning.

Preserving, canning and cold storage add only to the commercial value of food products. The preservation process adds nothing to the nutritional value of food.

As a general rule, the nearer a food is to that time when it was living, the more vitalizing and nourishing that food will be. That is why the tired city body glows with refreshment from a fortnight on a farm. There peas are brought from the living bush directly to the table; beans have scarcely left the stalk before they are served as energizing food; lettuce is brought in that is still crisp from morning dew; tomatoes are ready to burst with sunshine; potatoes freshly dug from the garden, still rich in minerals and vitamins which are not wasted in thick and wrinkled skins. There one partakes of Nature's sweets gathered from the Spring-urged sap of budding maples or sweets borne on wings from clover blossoms. Also in the country one may have milk fresh from brook watered pastures; eggs charged with vitality still warm from the nest; poultry that yesterday felt the impulse of life. On the farm one not only lives in the sunshine, but actually eats and drinks of the open air that built the physical stamina of America's pioneers.

Vitamins? Yes, vitamins aplenty in all fresh foods, and the fresher they are, the more vitalizing. Man should eat

of them abundantly, but always without gorging. Then there is no necessity for identifying and counting the vitamins.

Having thus discussed the present day furore over the chemical and vitamin constituents of food in general, we now may consider food for heart health in particular. There follow a few dietary facts that will aid in maintaining a high degree of nutritional health and that is exactly what the heart requires for constant performance,—a maximum of general nutritional health.

An individual choice of foods is built upon several factors—racial characteristics, ancestral tendencies, availability of supply, environment, occupation and even social level.

A Chinese who thrives on rice and tea would be a total wreck after a buffet luncheon in Greenland where Eskimos ensnare in a hand net a bird on wings and devour it while yet alive in its entirety,—bones, feathers and entrails. A Mongolian attempting to survive in the Arctics simply would not have a Chinaman's chance. What is one man's meat is another man's poison.

A laborer could not carry on for long on a clubman's diet. Conversely, a clubman would soon pall and sicken on the routine contents of a dinner pail.

Such factors as these are responsible for the instinct and appetite, which guide every individual's selection of food.

Therefore, speaking generally, a person should follow his inclinations, obey his inner urge and gratify his desires for food which at the moment appeals to him, avoiding only the tendency to overeat.

Good digestion waits on appetite. One should never eat simply for the reason that mealtime has arrived, but eat only when there is an appetite and relish for food. It seems unnecessary to say that one should not eat when physically tired, mentally weary, anxious, apprehensive or angry. Above all, one should avoid food when taken suddenly or acutely ill. Under all these circumstances, the secretion of digestive juices is greatly diminished. Furthermore, a person always should rest at the table for a few minutes after eating. For if one immediately walks rapidly away, blood that should be supplying digestive organs is sent to hurrying leg muscles.

The general rule of eating what you want when you want it should be governed by certain selective dietary considerations, which experience has proved will enhance the nutritional value of foods. Americans by and large can maintain a higher level of health by observing the following points in the selection of foods.

Variety is all essential in the modern American bill of fare. We require meats, starches, vegetables and fruits each day. The meat group (proteins) supplies bodily tissue. The starch and sugar group (carbohydrates) furnishes energy and endurance. Fresh vegetables and fruits provide the mineral salts to living organs.

THE MEAT GROUP

Of the meat group (proteins) the average business man or desk worker requires daily as much as would be contained in one lamb chop or in two eggs or one small fish or a handful of nuts. A greater daily protein intake than

that is not likely to be used by the average body, excepting of course by those who perform heavy muscular labor.

Meats are muscle builders. They produce power and sustain endurance. This fact alone is a reason why most people, who do not use their muscles exhaustively, require but a small amount of foods in the meat group. The meat group (proteins) includes as its principal examples flesh, fish, fowl, seafood, eggs, cheese and nuts. Lean muscle meat has very little nutritional value; fat meats are more nutritious. Ground and chopped meats often are indigestible.

Meats do not require the extensive mastication which should be accorded to starches, as they are not acted upon by the digestive secretion of the mouth, saliva.

People who are concerned over their high blood pressure readings often omit all meats from the diet, believing that thereby the blood pressure will be reduced. The blood pressure may be expected to fall only in those cases where kidney involvement is responsible for the high pressure registrations. For then the diminished intake of red meat reduces the necessity of eliminating its purine bodies by the harassed kidneys. Persons whose blood pressure readings still remain high when meat is omitted from the diet for a while, are often benefited in their general health when they again return to the small amount of protein required by the average individual.

Beef tea, beef broth, beef extracts and consomme, together with albumin water and oatmeal water, no longer bear a high reputation as foods for invalids. Their place has been taken, and rightfully so, by the more nutritious,

vitalizing and alkalinizing fresh fruit juices, alternating perhaps with milk, tea, coffee and wines.

THE STARCH GROUP

Of the starch group (carbohydrates) the average person requires daily as much as would be contained in three or four slices of bread, or in two potatoes, or in an equivalent serving of macaroni or of rice. These amounts, together with the starches and sugars in other food stuffs, such as peas, beans, beets, potatoes, etc., maintain a good general average of health. Naturally, highly energetic persons will require additional starches. Starches (carbohydrates) include as outstanding examples bread, wheat products, cereals, potatoes, macaroni, rice, dried beans and sugar.

Starches should be masticated thoroughly. Unless this group of foods is effectually chewed and thus well mixed with saliva, the first stage of starch digestion in the mouth is missed and the starch goes unprepared to the stomach where the second stage of digestion takes place. Result; belching, flatulence and possibly heart distress from insufficient mastication.

A failure to thoroughly masticate starches may explain many instances of morning heart oppression of which men frequently complain when walking to business. A hot cereal, such as oatmeal with cream, probably has been eaten for breakfast and such a semi-liquid starch cannot possibly be masticated, but slips from the mouth quite unchanged into the stomach there to ferment.

White flour and whole wheat flour are the cause of many discussions as to their relative nutritive value. White flour

as far as concerns freshness is not the equal of whole wheat flour. White flour is a commercially prepared food, and it is fortunate for remote civilization that wheat can be thus preserved and transported. The customary addition of milk products and yeast provide vitality for white flour and add to its otherwise desirable nutritional elements, thus robbing the whole wheat enthusiasts of much of their grounds for contention.

Whole wheat food stuffs cannot be prepared in all of the enticing culinary forms which gratify the wheat jaded appetite. Therefore, people whose tastes pall on the sameness of flavor, which characterizes whole wheat products, need have no fear that they are robbing their bodies in any particular when they return to white flour bakings.

SUGAR

Sugar, a concentrated carbohydrate, is the most convenient food for the supplying of quickly available energy. The body, when the stomach is not provided with sweets, manufactures its own sugars from starches, as well as extracting the sugar from vegetables and fruits.

Sugar is a very powerful, dynamic substance. In excess, it can so overwhelm the blood as to produce the coma (deep sleep) of diabetic shock. On the other hand, the diminution of sugars within the blood may so reduce vitality that a form of sugar called glucose is employed by rectal injection to resuscitate the dying. The potentialities of sugar are such that it should be regarded circumspectly and not passed around indiscriminately in the form of candy to children as an innocent pandering to appetite.

Sugar stimulates the force of the heart's contraction,

quickens the pulse rate, increases the circulation, stimulates the brain, energizes the muscles and within twenty minutes following its ingestion will appear as excess in the blood. All of which qualities are very desirable in moderation, but possibly harmful in quantity.

The heart requires a little sugar. One of the heart's specialized tissues, called the conduction system, is partly composed of a sugar called glycogen. That is why persons with fatigued hearts are advised sometimes to eat two or three pieces of candy three or four times a day.

Sweet chocolate, at first thought, may seem a surprising recommendation for a heart patient. Yet it is excellent for many hearts, combining as it does a highly nutritive food, the property of kidney stimulation and a percentage of caffein, which directly augments the heart's nutrition. In these days of the chemical camouflage of flavors, one must see that he procures genuine chocolate and not a synthetic "chocolate flavor."

VEGETABLES

Fresh vegetables and fruits should contribute the bulk of each meal and be eaten in plentiful amounts. They are not only rich in minerals, but also furnish the vitamins which the body transmutes into vitality.

Vegetables are often robbed of their mineral and vitamin contents by excessive boiling in quantities of water. The vitality and nutrition of the vegetables thus maltreated disappear when the excessive amount of water in which they were boiled is poured down the kitchen sink, while the vegetable residue goes to the dining table to serve only the purpose of intestinal roughage. But this is no

reason for eating vegetables raw. Cooking in a small quantity of water renders more digestible the starches, fibers and cellulose of plants.

FRUITS

Fresh fruits and fruit juices are so well known as highly vitalizing and nourishing foods, rich in mineral contents, that their daily consumption requires no further recommendation here, other than to suggest that a person should eat freely of all ripe fruits that agree with him. The skin of orchard fruits usually is rich in mineral constituents. The digestibility of bananas is enhanced for many people by scraping the banana after it is peeled. This fruit is composed largely of starch and for that reason should be thoroughly chewed. Ripe berries of all varieties should be eaten of plentifully as successive crops come on in season.

There are certain regulations covering the preparation and intake of meats, vegetables and fruits which, if observed, will mean greater nutritional value and a higher degree of health.

One should avoid fried foods. The grease soaked fibers of meats and vegetables unnecessarily overtax the digestion of fats.

Raw fruits and leafy vegetables, thoroughly cleansed, are desirable for most people. There are others who cannot digest raw foods and who must partake only of cooked fruits and leafy vegetables. One should follow his individual experience in this matter.

One should also avoid wherever possible all canned and preserved meats and vegetables. Dried fruits and evap-

orated vegetables also are lacking in the vitality of fresher food stuffs.

SUMMARY OF FOOD SUGGESTIONS FOR HEART HEALTH

After all this dissertation on foods, someone is likely to inquire blandly "But what shall I eat—menus have not been given here?" No better reply can be made than to quote the conclusions of Sherman:

"The one responsible for the dietary should first of all provide an adequate supply of milk, vegetables and fruits, after which breadstuffs, meats, fats and sweets may be added according to taste, purse, energy requirement and individual digestive powers. The foods to come next to milk in order of emphasis are the vegetables and fruits, chiefly because of their richness in certain of the mineral elements and vitamins. Eggs may well play a fairly important rôle in the diet, not in the place of milk or vegetables but as an added asset."

A DIGESTIVE HOLIDAY

This might be a point at which to digress for a moment and outline a gastrointestinal rest period, which is based on a diet of fruit juices for a day or two.

Persons who are actively caring for their hearts, and people who have once had heart trouble, are often gratified with the marked improvement in general health that attends a fruit juice dietary program.

This digestive holiday should be spent preferably at home. On awakening a laxative dose of a saline, such as epsom salts, should be taken. Then for the remainder

of the day until twilight, a glass of freshly expressed fruit juice, varying from three to six ounces, should be sipped every hour, totalling about eight draughts a day. No other food is taken. Water of course should be imbibed freely.

People who have been under a nervous or physical strain, persons who have a starch intolerance and those who do not seem to digest fats readily, frequently extend the fruit juice program over a second day.

Orange juice is favored generally for this purpose. Persons who cannot take orange juice without discomfort may select lemon juice, grape fruit juice, tomato juice or diluted grape juice, these substitutes being taken in less quantity, but at the same hourly frequency as the preferable orange juice.

Following such a course, its beneficial effects can be continued on returning to table food by reducing the customary intake of starches and meats to a minimum and by increasing the accustomed intake of fresh vegetables and fruits.

BEVERAGES

Water (H_2O) constitutes about seventy per cent. of the body's weight. In other words, if a man weighing one hundred and fifty pounds were to be completely evaporated, the residue would weigh forty-five pounds, one hundred and five pounds having passed off as water. This graphically shows the vast importance of water and also the necessity of a pure supply for human consumption.

Most water drinkers are healthy. Persons who drink very little water are not likely to be so healthy or robust. They must secure their fluid replacement by the drinking

of other liquids and by food, every bite of which is largely water. Those who dislike to imbibe water are usually sallow and undernourished. On the other hand, people who delight in excessive fluid intake are liable to be overweight and have a puffy appearance.

A pint of water passes out invisibly on the breath every twenty-four hours, while that which is evaporated as insensible perspiration by the extensive area of skin cannot be estimated owing to the daily variance of exercise, temperature and humidity. The kidneys customarily excrete daily from three to four pints of waste-laden water.

From the foregoing, it would seem that the moderate drinking of water is a very desirable habit to cultivate. Moderate water drinkers take a glassful, warmed or cooled, on arising, in the mid-morning, mid-afternoon and on retiring, as well as sipping one or two glassfuls during the three daily meals. These seven intervals total about fifty ounces of daily water intake, which is about thirty ounces short of the five pints of fluid which an average person ordinarily requires. The difference is made up by beverages, such as coffee and milk and also by the water constituents of food.

In addition to being a replacement fluid, water is also an eliminant. It acts as an eliminant by passing out through the kidneys, skin, lungs and bowels, carrying with it the waste products of bodily activity.

The percentages of water elimination are astonishing. Forty-six per cent. of fluid waste is by the kidneys; thirty per cent. by the skin; twenty per cent. by the lungs and four per cent. by the bowels.

The chemical formula of water is H_2O and this oxygen

content is a valuable source of oxygen supply. And further to commend it, the drinking of carefully selected water provides the body with minerals, such as calcium, sodium, potassium, magnesium and lithium, in a readily assimilable form and in a degree of solubility not otherwise obtainable.

Water taken during meals in moderate quantity acts as a diluent for digestive juices, thus enabling the juices better to penetrate the food mass, thereby benefiting digestion. A glass or two of water or other fluid should be sipped when used during meals. But when water is taken in excessive quantity at mealtime or when it is used to wash food down into the stomach, the digestive juices may be so diluted as to produce an indigestion. Table water may be cooled or chilled by ice; but water with ice in it is likely to retard and upset digestion and thus affect the heart.

Patients with gastrointestinal disturbances should not follow their own inclinations as to the drinking of water during meals, but should consult their physicians.

If the habit of water drinking can be cultivated, so much the better for the individual. But the drinking of water should not be forced upon any person, sick or well, against their natural disinclination or temporary protest. With the heart sick, many other beverages may be relished and the desires of the individual should at least be consulted.

There are times in illness and in health when Nature does not seem to either demand or desire water by the mouth. When the body's fluid elimination for any reason is impaired or reduced, Nature may know exactly what

she is doing when the fluid intake is instinctively held in abeyance. Nature knows.

RESTRICTION OF FLUID INTAKE

There are certain heart conditions, notably the one called the congestive type of circulatory failure, which require that the intake of fluids be limited. In such patients the ankles puff, pit or swell a little. Under these circumstances the doctor—not the patient—will decide upon the degree and variety of fluid intake limitation.

Suppose that in some persons with progressive heart muscle impairment the time comes when fluids from the tissues are not returned promptly and completely to the circulating mechanism. This extravasated water from the blood accumulates in the tissue under the skin and a little swelling is present—usually in the ankles and becoming more noticeable as the day wears on. Or the fluid may accumulate in the chest or in the abdomen, causing pressure symptoms, such as shallow breathing or a feeling of fullness in the bowels.

Certainly no person should ever voluntarily limit his natural inclination to fluid intake; such limitation is definitely the prerogative of the physician.

MILK

Milk is a heart food par excellence. Cow's milk is a gratifying beverage and a highly nutritious food to most of the human family. An occasional individual, who has an idiosyncrasy to milk, should be ruled by previous experience and avoid milk rather than to force it on a system rebellious to its use.

Most adults should consume a quart of milk a day, as a very valuable addition to a healthy bodily nutrition. The chemical replacements which fresh milk contains in abundance and the vitality with which it teems, can be adjudged not so much by a chemist's analysis as by the fact that milk alone keeps the infant's heart beating for months, while at the other extreme of life, it sustains existence indefinitely for those who are otherwise too feeble to exist.

Milk should be partaken of quite as Nature serves it, not hot or boiled and neither chilled nor iced. Dame Nature further ordains that her young mammals receive their milk in dainty, interrupted supply—in sips, rather than in the huge gulps which fill the stomachs of avid adults with balls of indigestible casein.

COFFEE

Coffee is a most beneficient beverage for adult hearts. There is scarcely a person of forty or more years of age whose circulatory efficiency is not enhanced by the mild stimulation of a cup of coffee.

Coffee truly might be called a heart food. It contains an active principle, caffein, in which there is an average of about two grains in a cup of rich well made coffee. Caffein dilates the caliber of the coronary arteries through which the heart muscle receives its blood supply. Thus coffee actually increases the nourishment of the heart by furthering a fuller flow of blood to its muscle.

If nourishing the heart were the only effect that coffee exerted on the human body, that would be reason sufficient

for the high regard in which humanity has ever held the beverage. Its effect on the kidneys is even more desirable, stimulating as it does their flow and increasing the output of kidney waste products called the solids of the urine. Even our intellectual workers find that coffee stimulates the breadth and depth of thought, while its recuperative value to worn muscles is shown by its universal use among the military forces of the world.

Persons who believe that coffee is unacceptable to their systems are often agreeably surprised to find that by omitting cream and drinking black coffee, sweetened if desired, the beverage will be rid of its unpleasant effects. Cream and milk may make the beverage indigestible by combining deleteriously with a substance called empyreumatic oil, which some coffees elaborate when they are decomposed by heat.

As with other food stuffs intended for human consumption, coffee berries should be freshly gathered, freshly roasted and freshly served. Coffee that has grown stale in warehouses or in the kitchen is as undesirable as other stale food products.

Coffee in moderation means a cup or two at breakfast and a cup at luncheon or dinner. One should not blame occasional wakefulness on a cup of after-dinner coffee. It might well be that the insomnia is induced by some mental, physical or atmospheric circumstance.

Unfortunate indeed are the sufferers from gastric disturbances, psychic irritability, mental conditions and nerve imbalance by whom hot drinks and such gentle circulatory stimulants as coffee are to be avoided.

TEA

Tea contains an active alkaloid called thein, the physical effects of which in equivalent dose are quite identical with the caffein of coffee.

The content of thein in tea varies extensively, depending on the variety of shrub on which the leaves have grown and depending also on the taste of the person who prepares the infusion. Even in teas so strong as to be bitter and unpalatable, the thein ordinarily must be very small indeed. If the drug content of a cup of tea were of equivalent strength with the caffein in an ordinary cup of coffee, not even a tea toper such as Ben Jonson, who is said to have partaken of sixty-four cups in one day, could go through life without a perpetual headache.

Therefore, we may conclude that from a physician's standpoint tea is not a substitute for coffee, regardless of the similar chemical composition of the active ingredients of both.

ALCOHOLIC BEVERAGES

Alcoholic liquors are of such recognized value in the restoration of the sick that permission for their employment was bestowed upon physicians by Congress when America was in the fanatical grip of the Liquor Prohibition Act.

Alcohol is more than a stimulant to the circulation. It is a food to the human body. Indeed, the body within its own mysterious chemical laboratories creates alcohol, which it utilizes as food.

When a natural product of the human economy for any

reason is reduced or absent, it would seem logical to replace that substance by external means. Hence, we find that ageing hearts usually thrive on small quantities of alcohol frequently repeated. There are also hearts that are prematurely old and circulations that seem to falter at times, which require daily alcohol in daily sustaining dose. Worn hearts these are and circulations weary from the battles of life's aggressive period. Even the beginning circulatory impairment of middle life is revived by a cocktail or highball before dinner which stimulates appetite and aids digestion.

All through life circulatory emergencies arise in which the readily available stimulant, alcohol, cannot be surpassed for prompt restoration and invigoration.

Virtually all heart patients require alcohol at some period of the illness. Where there are individual scruples against its use, the physician will find substitute remedies, but these are likely to be lacking in one of the two desirable qualities of stimulant and food, which alcoholic liquors possess.

Of course alcoholic liquors should not be used by a heart patient who has symptoms of brain congestion or other cranial defect. It should not be employed in neurasthenics with heart trouble, nor when diabetes complicates a heart condition. Likewise, when the stomach is involved or when the kidneys show evidence of irritation, that heart patient should avoid alcoholic liquors. People of the apoplectic type and those who have either a personal or familial tendency to high blood pressure readings should use alcoholic beverages only on the recommendation of a physician.

SMOKING

The smoking of tobacco is a pleasure and gratification that should not be denied a person solely because the heart is affected. There is no scientific proof that tobacco adversely affects the heart.

Only one of the many types of heart conditions seems to be aggravated occasionally by smoking. That is angina pectoris, in which condition the smoking of tobacco may precipitate a seizure. So may any other kind of concentrated smoke, such as burning leaves or kitchen fryings. Smoke or gas or atmospheres surcharged with vapors all reduce the amount of oxygen in the nearby air. Oxygen diminution of any type may be expected to induce heart oppression and pain in affected hearts.

That is the crux of the argument for tobacco reduction by heart patients,—the question of diminished oxygen intake. Nicotine absorption is not a consideration, being so small in amount as to be without clinical effect and therefore negligible.

Smoke cuts down the oxygen in the air. Some heart patients are already deficient in oxygen and require more than they can get of that life-giving gas. Whether concentrated tobacco smoke is intentionally inhaled in copious draughts, or whether it so permeates the surrounding atmosphere that the entire air of the room is impregnated with smoke, is not of much importance; oxygen diminution always results in the presence of smoke.

This air pollution can be minimized by cutting down the frequency of smoking; by taking only a few whiffs instead of consuming an entire cigarette or cigar, and by

smoking near an open window in a room that subsequently will be well aired and ventilated. With these precautions a man with a minor degree of heart trouble may continue his tobacco smoking.

Understanding this, the person interested in heart care may conduct his own experiments with his favored indulgence of smoking and be personally guided by the results. Certainly, the experiment cannot cost an accustomed smoker much more than a little chest pain, with the twinges of which his heart affection has already made him familiar. And if smoking hurts the man, he naturally will cut down the frequency, duration and degree of the indulgence. After a prostrating illness perhaps a man will decide to abandon tobacco, if it produces dizziness, headache, cough or a nasal congestion on resuming its use.

It frequently happens that the baneful effects of tobacco smoking are not immediately apparent in the heart's behavior, the evidence of intolerance first showing itself in stomach disturbances, such as belching, indigestion and "heart burn." All such gastric disturbances may add to the load of the heart and tobacco should be discontinued.

ELIMINATION

Intestinal sluggishness with its attendant ills of constipation, colitis, hemorrhoids and the like may reflexly disturb the heart's behavior. But no actual heart impairment is directly attributable to these intestinal sources. Of course, heart derangement and intestinal disturbances can coexist in the same patient, in which case elimination by the bowels becomes a matter of heart importance

rather than merely a daily routine for the preservation of health.

It is important to identify and correct any intestinal derangement or abnormality that may relieve a tendency to constipation before resorting to the habitual use of cathartics. Where no mechanical impediment to the onward passage of intestinal waste exists, natural daily evacuation can be fostered by water drinking, laxative foods, fruits, leafy vegetables with their roughage, exercises that act as a gentle massage for the intestines and, most valuable of all, by the persistent cultivation of a stated fifteen minute morning period wherein one not only awaits but mentally concentrates on a natural movement.

Where such natural methods are unavailing, mild saline laxatives taken on arising are often helpful and are less likely to be harmful than are drastic periodic purges, enemas or the daily use of mineral oils. These insoluble oils do nothing to aid peristalsis, which is the natural onward propelling motion of the small intestine. On the contrary, mineral oils may induce intestinal sluggishness by coating the bowel with a layer of oil that would prevent the intestinal walls from being acted upon by the waste products of food, which waste products stimulate peristalsis.

Equally as objectionable as mineral oils are various seeds, such as psyllium or flaxseed, which some people swallow in bulk to act as intestinal lubricants by a mucilaginous mass, which the seeds elaborate, besides adding roughage in undesirable quantities to the evacuation. A normal intestine does not require either lubrication or

roughage bulk, and it is most doubtful if abnormal intestines are ever benefited by the artificial ingress of either lubrication or large amounts of roughage.

Where Nature needs assistance, the physician should give the advice. Daily gastrointestinal care is too important a matter to be entrusted to the advertising solicitations of commercial houses. Constipation, cramps and abdominal tenderness may mean appendicitis or some other serious surgical condition of the abdomen, which can only be aggravated and perhaps rendered dangerous by the ill advised use of cathartics or roughage bulk.

THE NIGHT'S REST

The majority of people are much perturbed when they spend a wakeful night in bed. They regard rest and sleep as identical and if they slumber not, they assume that they have not rested through the night.

Sleep implies suspension of mental activities, a cessation of awareness and an abeyance of thought. Sleep represents the dulling of mental faculties by the waste products of fatigue.

The trouble seems to be that most people expect the heavy slumber of childhood to follow them throughout life. If one has had no mental activities during the day to produce the toxins of fatigue; if one has not put forth sufficient physical effort to narcotize himself; if a person has been thoroughly oxygenated during the day and therefore has no stupefying accumulations of carbonic acid gas in the body; if food has been moderate in quantity and expeditiously digested; if elimination has been fully sufficient in the twenty-four hours—why should a person al-

ready refreshed by such a day worry over not sleeping heavily at night?

One goes to bed to rest, to relax, and perhaps to commune with one's self. In the absence of worry the heart and circulation are just as much relieved of strain, whether the night be one of sleep or wakefulness.

A person has no reason to expect that each recurring night shall be spent in a profound intoxication of deep sleep from ten until six o'clock. Just as appetite is fickle, so is sleep at times elusive. But if a person is going to fret and fume because he does not promptly fall asleep on retiring, he simply robs body, mind and circulation of the benefits conferred by rest, repose and tranquillity.

By adopting such a program as follows, sleep can be wooed and often won by those who covet it. Let the evening repast be the lightest meal of the day,—only a cup of soup, a plate of salad, a bit of fruit; the evening hours should be spent in quiet pursuits, free from physical and mental excitement; and a glass of warm milk on retiring is found conducive to sleep. If one reads in bed while awaiting slumber, let one browse through pages that are free of mental stimulation. The exquisite phrases and comforting language of the Bible have soothed the way to sleep for many generations. It is a custom well worthy of adoption by persons troubled with insomnia.

There are some nights when scarcely any one sleeps soundly, as in hot, sultry weather and when the barometric pressure is rapidly changing or when other unfavorable atmospheric conditions are prevailing. As a general rule, a person who has spent the day in the open-air, afield or

afloat, may look forward that night with confidence to deep and refreshing slumber.

Dreaming may temporarily interrupt sleep, but is of such a momentary nature as not to be of any health importance, the longest dreams being said to occupy only the briefest fraction of a second in transpiring.

The amount of sleep required by an individual cannot be prescribed. There is no yard stick by which to measure sleep. There are persons who feel that they have accomplished something when they sleep the clock around. Others are fully refreshed by only four hours of sleep, as were Napoleon, Edison and other makers of history. Sleep also is largely a matter of habit with both well people and invalids.

However, the amount of nightly rest can be arbitrarily set as eight hours in bed. There is no improving on the old fashioned division of time from one sunrise to another,—eight hours to work, eight hours to play, eight hours to rest. Whether one actually sleeps for the eight hours in bed or only aggregates four hours of sleep is not a matter of particular importance to a person who is temperamentally tranquil. The important phase is that the heart and circulatory apparatus be relieved of the strain of the upright posture by eight hours of rest in bed every night.

A heart patient sometimes will complain that he cannot sleep when lying on the left side without developing oppressed breathing and heart pain. This is not to be wondered at. Many persons, who are perfectly healthy and who have fallen asleep while lying on the left side, will awaken suddenly with a start and a momentary catch-

ing of the breath. Both disturbances are perfectly natural. When lying on the left side during sleep, the muscular support of the chest wall relaxes. The heart is compressed from above by overlying structures and pressed upon by the mattress below, so that actual mechanical compression of the heart gives rise to the disturbing sensations. Unless the neck and shoulders support the weight of the chest, very few persons can recline for long on the left side, let alone sleep when on that side.

Pillows may concern a person who is practicing heart care, as there is a general idea that one should lie flat on the back when in bed—a most uncomfortable position. The spine curves forward from the shoulders to the base of the head. The hollow formed by this forward curve requires that a pillow be used in order that the spinal column may be supported in a natural position when reclining. Again, the head is midway between the shoulders; when a person reclines on either side, pillows are required under the face to support the head in a natural and comfortable position. Many people rest better when they are propped up on several pillows. It is purely a matter of personal comfort as far as the interests of the heart are concerned.

HEARING THE HEART BEAT

Hearing the heart beat when lying in bed is a circumstance that causes many people concern. There are disturbances of hearing in which the semicircular canals are involved, which at times reproduce in the ear a succession of distinct heart beats. This sound of course does not originate in the heart.

Here might also be mentioned another symptom of no heart importance, but which creates much agitation when a person first notices it. Occasionally, the heart can be heard to beat when the ear is on a pillow—purely a phenomenon of bone conduction of sound. In certain positions, in the stillness of the night, a vibrant bedspring can resound to the beat of the heart; but this "metallic heart sound," as the alarmed person calls it, also is due to sound conduction and in nowise is connected with the heart.

ALTITUDE AND CLIMATE

Altitude and climate will greatly modify the atmospheric conditions under which a once affected heart may thrive.

When a person who has been reared and made his home at either high altitudes or sea level acquires heart trouble, that person does better in the customary environment. Heart patients who have lived at moderate altitudes usually are oppressed by elevations of over five thousand feet, for the rarified atmosphere adds effort to breathing and induces changes in the circulatory balance of the superficial capillaries. Indeed, even in healthy persons the attaining of heights, as when vacationists ascend mountains, very frequently produces a temporary heart collapse. And persons with unsuspected heart involvement may acquire permanent heart damage as a result of the sudden ascent to high altitudes. People who have fully recovered from heart affections may be adversely affected in a similar manner at any time on attempting altitudes.

Heart patients who have acquired their condition while

living at moderate elevations of from two to four thousand feet, rarely do well when they visit at sea level. Conversely, a heart that has become impaired while a person has been living by the sea, probably will have its impairment aggravated when the individual moves to the mountains.

In short, when a man has acquired heart trouble, there is little to be gained by changing his accustomed location in a search for heart health. The old home usually is the best home.

Climates that are hot, dry and dusty afford sufficient reason for a heart patient living elsewhere. Climates where the nights are rather moist, due to the proximity of lakes and rivers, or where heavy morning dews abound, and where the days are breeze blown and sunny, are ideal for the sojourn of persons with affected hearts. Great cities have no climate—only atmosphere—within their corporate limits, and that atmosphere usually is vitiated by the contamination of dwelling smoke and congested motor traffic in civic centers, while the outskirts of many cities are redolent with atmospheres polluted by manufacture and commerce. Heart patients should not elect to dwell within a city's walls. Where they have a choice, they should live at open moderate elevations where their hearts can sing with the psalmist "from the hills cometh my strength."

Ocean voyages are suited delightfully to the vast majority of heart patients who have lived at an altitude of less than two thousand feet. A sea voyage offers change of scene, change from accustomed routine, abundant sunshine, continuous ozone and exhilarating breezes. Seasick-

ness is so rarely of importance as far as aggravating an afflicted heart is concerned, that the possibility of mal de mer enroute needs detain only those heart patients who are too acutely ill or too recently recovered from an acute illness to have undertaken the voyage in the first place.

MATTERS PERTAINING TO SEX

There is a phase of physical activity, namely the biologic urge, which is not improperly to be mentioned when speaking of the conservation of heart resources.

Youth is the reproductive age. That which blooms and blossoms by natural law is intended to fructify and bear fruit. This is the prerogative of youth. But youth must inhibit its instinct when the heart of either participant is impaired, even to the point of complete abeyance of the function while the heart is acutely ill, the interdiction to be perpetuated through the months of convalescence, until the full restoration of that normal health which justifies reproductive acts. No other physical activity imposes such consummate demands on the heart and circulation. In health the circulatory reaction is highly beneficial. But in the presence of heart impairment the sexual instinct, unless restrained and temperate, can only deplete heart reserve and further impair the afflicted individual's general health.

When middle age is attained Nature represses the reproductive faculties by instituting glandular changes in both sexes. It is not improbable that these inhibitions are imposed to conserve the physical expenditures that otherwise would be demanded of the circulatory apparatus that

is undergoing the capillary blood vessel changes which occur in middle life. The reproductive age of youth is now past. Any sustained attempt in middle age to perpetuate the function after its abeyance by Nature is to court heart fatigue and, in the presence of known heart impairment, overindulgence not infrequently induces acute heart prostration.* Moderation and mental control are the safeguards that must be thrown about the heart in the marital relation of middle age, particularly when one of the persons is many years the junior of the other.

Imaginative men, who refuse to recognize the age periods of life and who are therefore incapable of repression, are liable at middle age to pay the penalty of heart damage for violation of Nature's inexorable laws. Such a residue of the biologic urge as remains in the late forties or after should be employed naturally and never stimulated or induced by artifice. *Act your age.*

During the heart prostrations of middle age, the biologic urge usually is held in abeyance as one of Nature's protective mechanisms. When it returns, its reappearance is often indicative of regained health and its indulgence likely will prove exhilarating, providing the one time heart patient is the passive participant.

ANESTHESIA IN HEART CONDITIONS

For the relief of heart conditions it is frequently necessary that surgical operations be performed on other structures of the body. For example, removal of the tonsils may be indicated; teeth may require extraction or perhaps an infective gall bladder should be drained or the

* See angina pectoris reference on page 56.

appendix removed. This brings up for consideration the choice of anesthetic for the various degrees of heart involvement.

Local anesthetics, such as the injection of novocaine, should be used for the brief operations of dental extractions in any heart condition, in preference to nitrous oxide gas, especially when the patient has respiratory embarrassment or an appearance of blueness or is apparently anemic.

For the major operations, and the removal of tonsils should be regarded as a major procedure, the anesthetic of choice is ether, its total amount being reduced by the initial use of nitrous oxide with oxygen. Ether is a heart stimulant and patients suffering from any heart condition with but one exception usually take ether very admirably. For example, even the grossly irregular heart of auricular fibrillation (page 143) may develop a period of natural regularity under ether anesthesia.

The one outstanding exception to the favorable reaction of heart patients to ether anesthesia is coronary artery involvement. Patients who have had this condition should be prepared for operation, where possible, by a preliminary course of rest and drugs in sustaining dose.

During etherization oxygen should be continuously administered, in order to mitigate the after effects which sometimes retard convalescence from an operation.

The anesthetic, chloroform, has not been mentioned in connection with heart conditions and should not be employed during a surgical operation on a heart patient. However, a few inhalations of chloroform are surprisingly safe and immediately beneficial in relieving aggravated

spasms of angina pectoris. Another exceptional instance of the beneficial effect of chloroform is shown in its use during childbirth to mitigate the pains of labor in mothers who have heart defects.

PERIODIC HEALTH EXAMINATIONS

A person has not done all that it is possible to do for the preservation of heart health until there is included in the conservation program a periodic health examination.

It is obvious that an annual physical survey, together with laboratory studies, may detect the early beginning of diseases or may discover hidden or unsuspected defects which at an early stage offer very little obstacle to their correction.

With most men, procrastination is the thief of good intentions where health examinations are concerned. Some select legal holidays as being the most convenient time to visit their physicians, for then there need be no haste in returning to the office. Others select their birthdays as dates that cannot be forgotten. What is perhaps the greatest number consult their doctors in the early Fall, following the recreations of the Summer and before entering upon the arduous duties of the Autumn's resumption of business.

An annual inventory of the physical reserves, a balance sheet of the body's assets and a statement of the health liabilities all constitute a dependable policy on which to predicate the business program of the ensuing year.

Know that you are well. **Knowledge Is Power.**

CHAPTER IX

INDIVIDUAL INSTRUCTIONS FOR SPECIAL HEART CONDITIONS

A lifetime is too brief a period in which to acquire full knowledge of the disorders of the heart and circulation. Since the days of Ancient Greece, 400 years B.C., when Hippocrates, the Father of Medicine, wrote of the human body, the heart has captivated the imagination and inspired the pens of physicians throughout the intervening years. Poets, too, have sung of the finer attributes of mind and soul as originating in the heart. Thus through the ages there has grown up around the heart voluminous literature, containing much that is true and much that is fanciful, yet all of it fascinating concerning this Citadel of Life.

Modern Medicine has made monumental contributions to the world's knowledge of the heart, thanks to the introduction of the microscope, the revelations of the clinical laboratory, the newer science of physiology and the application of graphic methods of study, whereby the heart itself writes the story of its condition. And to crown the modern contributions to our knowledge is the extensive information of the heart under stress and distress, which was garnered by the physicians of the World War where men, for the first time in history, were massed by thousands under military regulation and medical observation.

Therefore, any attempt to present a conception of the

disorders of the heart and circulation on pages such as these necessitates the briefest thumb nail sketches and telegraphic style. It must suffice here simply to define a heart condition, to mention its usual cause, to outline how the one afflicted feels and to suggest ways in which the patient may contribute to his own recovery.

THE VARIOUS TYPES OF HEART DISTURBANCES

Disorders of the heart include affections of the muscle, the membranes and the valves. The heart muscle is called the myocardium, inflammation of which is called myocarditis.

The lining membrane is called the endocardium and any inflammation of this thin delicate, translucent structure is called endocarditis. Where the membrane is reduplicated to form the heart valves, any affection thereof is designated as valvular endocarditis or valvulitis. It may derive a special name from the valve involved and from the nature of the deformity, such as mitral stenosis, meaning narrowing of the mitral valve, or aortic regurgitation, meaning failure of the aortic valve to close properly.

The membrane that surrounds the heart, as a paper bag snugly surrounds a pear, is called the pericardium; when inflamed the condition is termed pericarditis.

INFLAMMATION OF HEART MUSCLE (MYOCARDITIS)

Inflammation of the heart muscle is also known as myocarditis. The term, myocarditis, is loosely employed to describe any heart weakness; but this is a serious error.

The suffix "itis" means "inflammation of" and should be applied to the heart muscle only when it is actually inflamed, thus constituting true myocarditis. To employ this term for any other type of heart impairment stigmatizes the person with an unwarranted diagnosis. This will not only react adversely on the individual's mental attitude, but also will complicate unnecessarily any future application for life insurance.

A large number of persons alleged to have myocarditis are up and around, attending fairly well to their customary affairs. As there is no morbid process in their condition, it may be called either myocardosis, heart muscle fatigue or simply tired heart.

ACUTE MYOCARDITIS

Actual acute myocarditis is a dramatic episode in the life of a heart. It may arise suddenly during the course of an infectious fever, although it can develop insidiously from hidden infections or chronic suppurations elsewhere in the body. Acute myocarditis is characterized by extreme prostration, chest pain that tends to be continuous, hurried shallow breathing, fever, chills, sweating, delirium and a rapid and often irregular pulse. The course may later be followed by swellings and dropsical accumulations in the legs, abdomen or chest.

ACUTE HEART FAILURE

It will happen, as would naturally be supposed, that when the heart muscle is inflamed acutely, its efficiency is hampered. The heart attempts to perform its duty of maintaining an adequate circulation by increasing its

speed. This increase in rate still further tires the inflamed muscle and, dependent on the severity of the inflammation, the heart may be expected sooner or later to fail in its function of supplying a circulation that is adequate for the daily needs of the individual. This constitutes heart failure.

Some people have a dread of the phrase heart failure, as they imagine that it means a sudden cessation of life. The term simply means that the heart fails in the full performance of its duty as above explained.

In former days what we now call heart failure was referred to as "decompensation." When the failure improved under rest and drugs, it was said to be "compensated," and should the heart failure later reappear, it was known as "broken compensation." The group of "compensation" terms is disappearing as more descriptive names are evolved.

Acute heart failure varies in degree from a simple breath oppression to the severe stages of fluid accumulation in various organs, such as congestion of the lower part of the lungs by fluid, which extravasates from the blood, the condition being called pulmonary edema. The physician will anticipate and control such a situation by the use of drugs and other remedies. The patient may assist in the treatment by observing rest.

In acute myocarditis, with its symptoms of heart muscle failure, absolute rest, absolute in every particular as set forth on page 78, must be observed by the patient. This regulation must be rigidly enforced by those near and about him, during the days or weeks that the acute stage of the illness is running its course. As the condition sub-

sides, no one but the physician in attendance should assume the responsibility of lessening restrictions on the patient. As convalescence sets in, more liberties will be allowed and a gradual return to accustomed associations be permitted.

The later stages of convalescence and the early period of recovery will see the inauguration of limited and gradually extended excursions into physical activities, which will reeducate the heart to a natural exercise response, as set forth on page 178.

CHRONIC HEART MUSCLE IMPAIRMENT

Chronic myocarditis is a term that is employed to describe the heart impairment that may persist when acute myocarditis has subsided. This phrase unfortunately also is applied to the failing heart of advancing years. Even the lazy and unexercised hearts of indolent persons have been called chronic myocarditis. Manifestly, the term is absurd, as no heart muscle inflammation is present. Persons who are alleged to have chronic myocarditis are not acutely ill, not prostrated in bed nor are they in any particular distress, excepting under physical or mental effort that is in excess of the limited capabilities of the heart's impairment.

Chronic myocarditis is vanishing rapidly from the nomenclature of today. For what once would have been called chronic inflammation may prove to be only a long-standing irritation perpetuated by infective tonsils, dental abscesses, gastrointestinal disturbances and similar defects. Nowadays, such sources of heart impairment can be corrected; but in former times, when their exist-

ence was not suspected, they contributed a perpetual load to the previously damaged heart.

The phrase "chronic myocarditis" then can describe only the scars that remain from an acute inflammation that has long since subsided. On the one hand, the actual scar tissue that persists may be no larger than a grain of wheat; yet even such a small area can produce a variety of pulse irregularities. Or, depending on the location of the myocardial scar, very constant murmurs may be adduced, which sometimes are regarded incorrectly as evidences of active disease in heart tissue. On the other hand, the extent of scars may involve three-fifths of the entire heart and yet that organ will continue to maintain tranquilly a fairly adequate circulation for years, with a person so afflicted finally dying of some intercurrent condition.

So the person who is said to have "chronic myocarditis" need have no anxiety for the present nor any particular dread of the future. Every village has its quota of old codgers who have had "myocarditis" for years and who boast of having outlived the doctor who originally informed them of their heart defect. Yet they go hobbling through the years into senility—these Veterans of the Grand Army of Chronic Myocarditis—with no more heart care than the frequent daily rest which necessity imposes. The journey along life's highway would have been pleasanter and there would have been better opportunities for attainment had these men known at the outset how the impaired efficiency of damaged hearts can be perpetuated. For example, through the eradication of dental decay and infective tonsils and by the adoption of a daily hygienic régime, as well as by more extensive methods of rehabili-

tation, the efficiency of impaired hearts can be conserved indefinitely.

"Chronic myocarditis" then, it seems, denotes an established, inactive and unprogressive impairment of heart muscle. As such, it requires the general care that all hearts should receive, as set forth in Chapter VIII. Should the impairment become prostrating at times, a period of rest and drug treatment should be instituted under medical supervision.

As the years accrue, circulatory deficiencies may be expected to arise more frequently and the term "myocardial degeneration" may be applied to the seemingly progressive heart impairment. Such a heart muscle, rather than be styled degenerated, might better be known as myocardial deterioration, meaning simply impairment of quality. It is nothing more than impaired quality, when some capillaries continue to shrink with the advance of years in hearts once scarred. It is still impaired quality when in the same heart other capillaries fail to act effectively through a gradual loss of the vasomotor nerve sensitivity that controls the caliber of capillaries. Therefore, deterioration is a term more descriptive than "degeneration."

ACUTE INFLAMMATION OF THE LINING MEMBRANE OF THE HEART

Acute inflammation of the lining membrane of the heart (acute endocarditis) is the most tedious, exhausting and dramatic experience that the heart is called upon to undergo. It arises most often as a complication or sequel of acute rheumatic fever, St. Vitus' dance, tonsillitis, in-

fective teeth or bacterial infections (bacterial endocarditis). The toxins of these diseases act as poisons on the endocardium (toxemia). Indeed, bacteria may actually be carried in the blood stream (bacteremia) directly to the lining membrane and lodge on the walls of the heart (acute mural endocarditis). Again the bacteria may invade that part of the lining membrane which is reduplicated in folds to form the heart valves (acute valvular endocarditis).

In acute endocarditis the patient usually is profoundly prostrated, anxious and desperately ill. In acute endocarditis some degree of myocarditis also is present, producing the harassed breathing, chills, fever and sweating of acute myocarditis. For the inflammatory process could scarcely be confined to the thin delicate endocardium alone, but naturally spreads to the underlying heart muscle. Pulse irregularities may be present, but are not so likely to dominate the picture of endocarditis as are murmurs. The murmurs change in character from time to time as the inflammation involves successive valves in varying degrees of intensity.

The situation of the heart is dramatic. It is driven by toxins, impeded by inefficient valves and deprived of adequate nourishment by an infected blood stream. Yet despite these many obstacles, the heart must struggle to maintain some pretense of circulatory efficiency. A tragic emergency suddenly arises. Without warning, particles of blood clots (thrombi) become detached from the valves and sweep into the circulation (emboli) to find a lodging perhaps in the lungs, brain, kidneys or even the heart's own muscular structure. With a heroism undaunted, the

outraged heart must now engage in the business of supplying recruits (lymphocytes) for the repair of the tissue damaged beyond the lodged clot (infarction). In addition, the heart must set up a collateral circulation around the part deprived of blood by the lodgment of the clot, as well as address itself to the task of restoring the disordered function of the assaulted organ.

Little wonder that the heart, which triumphs in such a Herculean struggle, should expect of its master the well earned right of ease and diversion for the remainder of life!

The part that the patient must contribute to recovery from acute endocarditis is more than the observance of absolute rest during the acute stage of the illness. For Nature herself, through the instrumentality of extreme prostration, will attend to the imposing of physical rest during the critical period. The binding obligation that devolves upon the patient is to accept in grateful resignation the necessity for prolonging the stage of convalescence, and extending the stage of recovery into many months, if needs be. There can be no dispatch about the return to customary activities. There can be no compromise of the necessity for prolonged and constant tender care, when a heart that battled tragically with acute endocarditis has fought a good fight and finished the course.

CHRONIC ENDOCARDITIS OR CHRONIC VALVULAR DEFECTS

Chronic endocarditis, a term describing long standing inflammation of the lining membrane of the heart, is as much of a misnomer as is chronic myocarditis, for in

neither instance is there any inflammatory process actively affecting the tissues. In chronic endocarditis the inflammatory stage has long since passed, and only its ravages, in the shape of mural scars or valve deformities, remain. The damage resulting from chronic endocarditis is established and inactive.

The tissue scars that remain from a once acute endocarditis may be situated on the walls of a heart chamber and, if confined to this location, give no clinical signs of their presence, unless of course an underlying area of heart muscle was involved during the acute endocardial invasion. Such mural scars cause the patient but little discomfort or inconvenience.

However, where the heritage from an acute endocarditis involves the heart valves, symptoms and physical signs are likely to arise because a mechanical impediment to the propulsion of blood is offered by the deformed valve. Thus structural valve disease impairs the heart's efficiency, reduces the volume of its pulsations and, under physical or mental stress, may bring on some of the symptoms of heart failure (page 130).

VALVULAR DEFECTS

The patient with impairment or deformity of a heart valve is likely to complain of heart consciousness, dull pain on sustained effort, reduced physical efficiency, lowered vitality and a disinclination for physical and mental undertakings. The face may be either pale or congested, and the lips colorless or bluish.

To the physician, structural deformities of various heart

valves produce a variety of unusual sounds called murmurs. But the detection of an unusual sound in the heart does not by any means always indicate valvular deformity. Therefore, it seems appropriate at this point to clarify some of the widespread confusion that exists concerning various heart sounds. This may spare the reader the anxiety that is sometimes engendered by the chance overhearing of the word murmur during a medical examination.

First of all, there are natural tones produced in a healthy heart as the muscle contracts and also other sounds evoked by the valves as they close. Certain circumstances of health, such as apprehension or physical overstrain, may cause the heart muscle to produce an overacting sound, or a valve may snap together with a vibrant ring. These are not murmurs; they are only amplifications of perfectly natural sounds.

A murmur is an unnatural or extraneous sound that intrudes itself among the natural sounds of the heart. It may be transient and physiologic, as when the valve leaflets fail to approximate as a result of excessive physical strain. Or a murmur may be permanent and pathologic, as when the valve has been deformed by previous endocardial inflammation. Again, a murmur may be present that indicates neither health nor disease, as in the congenital defect called patent foramen ovale (page 25).

Therefore, all murmurs do not mean "leaking heart valves" and "leaking hearts" do not mean, as people otherwise well informed sometimes imagine, that the heart chambers are spilling out blood somewhere in the dark

recesses of the body. The idea simply is this; when a valve for any reason fails to close properly, the blood that the valve should confine to the receiving chamber will surge back through the partially opened aperture into the space from which it came. As the blood passes backwards, it sets a valve leaflet into vibration, producing a purring sound, which is called a murmur. This unnatural sound is incorrectly referred to by some people as a "leaky heart."

Murmurs have an important place in heart appraisal, especially when the time or manner of their occurrence suggests that the heart muscle participates in their production. But long standing murmurs, which are often called chronic endocarditis, cannot be so importantly regarded; they are but the established end result of localized valve distortion that probably was produced many, many years before.

INFLAMMATION OF THE SAC SURROUNDING THE HEART

The pericardium is a tough membranous sac which surrounds the heart and when it is inflamed the condition is called pericarditis. Inflammation of the pericardium is associated frequently with acute myocarditis and when the endocardium is involved at the same time, the inflammation of all three heart structures is referred to as pancarditis. Pericarditis may arise independently and the inflammation be confined to the pericardium alone, notably in tuberculosis.

The inflammatory process may be comparatively dry and that part of the membrane which is reflected over the

heart adheres to the outer pericardial sac, producing an adherent pericarditis. Or the space between the two layers of pericardium may be filled with fluid, producing a pericarditis with effusion.

The symptoms vary with the type of inflammatory exudate. In adherent pericarditis, a sharp superficial pain may be felt with each tug of the heart and there may be a grating sensation as one surface, roughened by inflammation, glides over the other. In pericarditis with effusion, the heart is being compressed by the bag of water which gathers around it. Consequently, there is a dull constant aching of the heart, which is intensified when a deep breath adds further to the heart's compression. These conditions may last a few hours or a few days. Pericarditis with effusion appears very suddenly, may diminish almost as rapidly and disappear just as the physician is considering whether to tap the sac, in order to relieve the heart of the serious symptoms of oppression and pain, which sometimes develop as the fluid accumulates. The great majority of effusions are thus self-resolved.

There is another transient pericardial inflammation called a pericardial friction rub, occurring over the front of the heart during the early stages of coronary artery obstruction. It is likely to last for only an hour or two and may induce short, sharp stabbing pains while in progress.

There is little for the patient to do in assisting the doctor during an attack of pericarditis, other than to remain in bed where medical attention and nursing care can alleviate the distress and hasten a return to normalcy.

Having now finished the discussion of Disorders of the Heart, we may next consider Disorders of the Circulation.

DISORDERS OF THE CIRCULATORY APPARATUS

Disorders of the circulatory apparatus are evidenced so frequently by an irregular pulse that it seems appropriate at this point to discuss the various pulse irregularities before considering special conditions involving the circulation.

THE PULSE IRREGULARITIES

An irregular pulse may be fully compatible with health, or it may be an evidence of heart impairment. Irregularities may be simple and benign, or complicated and ominous. They occur throughout life, having been observed an hour after birth and again in patients ninety-five years of age. There are five common varieties of irregular pulse to be mentioned here in the order of their severity. A brief comment is also necessary as to whether a given irregularity is within the limits of health or indicative of heart impairment.

YOUTHFUL PULSE IRREGULARITY

The youthful type of heart irregularity (sinus arrhythmia), previously mentioned on page 32, is harmless, fully compatible with health and is rather to be expected in the young. The pulse at the wrist waxes and wanes as the youth breathes. The rate increases on inspiration, decreases on expiration and remains unchanged when the breath is held. Sinus arrhythmia is regarded as an indication of health, for it does not occur in deranged hearts.

PREMATURE BEATS

Premature beats are also referred to as intermittent pulse, extra systoles, dropped beats and as "heart turning over" or "thumping."

When a person first discovers that he has a premature beat, he usually is very much alarmed. The thought may obsess him that the heart will stop beating, an idea which naturally causes tremendous concern. Often before the doctor's office is reached, the irregularity has disappeared, only to return again when the person is once more quietly reading the evening paper or just when he is falling asleep. In other words, this irregularity appears when the heart is at ease and disappears when the heart rate is for any reason speeded up.

A premature heart beat usually is an indication of a toxic condition elsewhere in the body, and is generally caused by some simple circumstance, such as gastro-intestinal disturbances, nerve fatigue, physical weariness or focal infections. While a premature beat usually is an evidence of heart muscle irritability, it is scarcely ever of serious heart significance, excepting when the irregularity develops and rapidly progresses during the course of an acute illness.

To illustrate the frequency of this irregularity in health: Perhaps forty per cent. of the hearts that reach fifty years of age have exhibited premature beats at one time or another. As the years multiply after fifty, premature beats are very common and when unaccompanied by other confirmatory heart signs seem to be simply a manifestation of capillary shrinkage in an ageing heart.

The person who notices an irregularity of the pulse should not be content with assuming that the disturbance is only a simple premature beat. A physician should identify the irregularity and seek the underlying cause, which, if neglected, might eventually lead to some degree of heart impairment.

SEIZURES OF HEART HURRY

A seizure of rapid heart rate is called paroxysmal tachycardia and varies from one hundred and twenty to one hundred and eighty beats or more per minute. It starts very suddenly as though a hammer struck within the chest, terminating with the same sensation. Suddenness of onset and suddenness of termination distinguish true paroxysms of tachycardia from the ordinary heart hurry of excitement, fright or anxiety. The paroxysm may last five seconds or five weeks, although the seizures customarily terminate within an hour or two.

Paroxysmal tachycardia does not seem to occur with any particular heart condition nor is it the precursor of oncoming structural disorder of the heart. Furthermore, paroxysmal tachycardia does not in itself damage the heart. It arises very often in persons of the high strung and excitable type, although not altogether unknown to the phlegmatic temperament.

Persons with paroxysmal tachycardia usually can control the seizure by various procedures which they themselves have discovered, such as holding the breath, bending forward, twisting to a side, slowly swallowing ice water or by pressing the side of the neck. All of these maneuvers exert pressure on the pneumogastric (inhibitory) nerve

where it courses along the neck, thereby *inhibiting the* rapid rate, which undoubtedly was set up by the sympathetic (accelerator) nerves, and abating the paroxysm of rapid heart.

Paroxysmal tachycardia does not seem to be a dangerous condition, although of course the first attacks are always alarming. Once inaugurated, it has a tendency to recur on slight provocation. Persons subject to the paroxysms of course should lie down, should stay in bed while the rapid rate endures and should between attacks have their physician conduct laboratory, x-ray, neurologic and other special studies in the hope of ascertaining some provocative factor for the sympathetic nerve excitability, which is the usual cause of paroxysmal tachycardia.

TOTALLY IRREGULAR HEART

A totally irregular heart (auricular fibrillation) is due to a disorder of rhythm in which the top chambers of the heart, the auricles, instead of contracting rhythmically at a normal rate of eighty beats per minute, are contracting abortively and in haphazard fashion, much as the narrow end of a pennant might fibrillate in a continuous gale. The result is delirium for the ventricles as well and they contract at irregular intervals on a volume of blood that constantly varies. This produces a pulse wave that arrives at the wrist in utter disorder, continually varying in rate, rhythm and volume.

As might be supposed, auricular fibrillation is an evidence of serious heart muscle involvement. There are some people with whom the condition deals lightly and others in whom the disorder is of brief duration without any ap-

parent bad effects. But on the whole, auricular fibrillation should be regarded as an evidence of serious heart muscle damage until its benign type is established.

Auricular fibrillation is of profound significance when it occurs during acute myocarditis, acute endocarditis or other acute infectious diseases, and also when it arises as part of the picture of angina pectoris and coronary artery occlusion. Under such circumstances it is indicative of a heart organically deranged.

Fibrillation assumes many different rôles. It may be of the periodic type, appearing for only a few minutes and causing in that brief interval a perfectly natural apprehension on account of the chest oppression, a sensation of the heart fluttering, circulatory disorder or faintness which it induces. Within five minutes it may disappear suddenly, whereupon the heart rhythm becomes normal again. An interval of several days or even several weeks may elapse before another brief, transient or periodic attack arrives to upset the circulatory balance and mental equilibrium of the one afflicted, who in the meanwhile had been assured by a physician that there was nothing wrong with the heart at the time of examination.

Many a person alarmed by such an attack has sent for the doctor, only to have the symptoms and signs completely subside by the time the physician arrived; but perseverance in procuring medical attention has been rewarded by the identification of the culprit as auricular fibrillation of the transient or periodic type. There are other instances in which fibrillation has set in spontaneously and totally unrelated to any preceding illness,

dropping, as it were, from a clear sky to become the forerunner of serious heart impairment.

Regardless of the type of auricular fibrillation, whether it be transient or permanently established, well tolerated or prostrating, any person whose heart is fibrillating should be in bed until the relative innocence of the condition or its effective control by drugs is established to the complete satisfaction of the physician. Then a tireless search should be conducted throughout the body to identify some hidden cause for the heart delirium.

HEART BLOCK

Heart block is recognized principally by the slow pulse rate which it produces. This slow rate is caused by an impediment which toxins or disease impose in the pathway of the heart's contraction impulse (see Conduction System, page 16). Only the impulse is impeded or blocked. Heart block has nothing whatever to do with the free passage of blood, as some people conjecture, even to the point of imagining that an obstruction has stopped the flow of blood, as leaves might plug a rain spout.

Block may be of a minor degree, as when the impulse is merely delayed (delayed conduction), getting through the impediment one hundredth of a second or so later than usual. Even when high grade complete block is established, it does not threaten life. For when the contraction impulse cannot get through from auricle to ventricle because its passage is blocked completely, the ventricle then initiates a rhythm of its own and beats along totally independent of the auricular impulse at a rate around forty beats per minute. Thus life may be conserved for an in-

definite number of years. This independent rhythm, which the ventricles can adopt in an emergency, is just another evidence of the heart's amazing power of adaptability in defending life against the inroads of disease,—the most beautiful of all examples of the body's many protective mechanisms.

Heart block ordinarily does not cause any suffering. It is a condition that is more inconvenient than disagreeable. The inconvenience arises because complete block reduces the heart rate to a figure less than sixty beats per minute, maintaining it in that neighborhood. Thus the rate is not permitted to rise materially on exercise, and of course that makes the person restrain his physical activities under penalty of heart distress or fainting.

Heart block is fraught with serious possibilities when it arises during any acute illness or during convalescence from a recent heart invasion. Occurring in an illness, its presence may mean that extensive heart impairment impends, and the same interpretation sometimes can be placed upon the sudden heart block of convalescence. But it happens more frequently that the heart block of convalescence indicates that drugs, which were necessary to combat heart weakness when the illness was acute, should now be discontinued, as the full beneficial effect of the drugs has been secured.

Another of the many varieties is called **bundle branch block**, meaning that one of the two branches of the conduction bundle, which goes to each ventricle, is blocked. The block delays the contraction of the ventricle which it supplies. Therefore, instead of one sound being produced, as when the healthy ventricles contract naturally

simultaneously, in bundle branch block two ventricular contraction sounds are heard. This phenomenon is sometimes called a gallop rhythm or a "split heart sound," the latter phrase being occasionally fraught with a groundless terror to a person who overhears the words during a medical examination.

Heart block at one time was believed to be caused largely by syphilis, probably for the reason that the very first time this condition was described in 1912, the heart was found to be blocked by a syphilitic tumor in the conduction system. Of course, we know now that any disease, even influenza, can produce heart block. Nevertheless, one should be on the safe side and have laboratory tests made to eliminate the possibility of syphilis in every case of heart block.

Persons who have chronic heart block already are familiar with their physical limitations on effort and do not need to follow any particular requirements, other than to observe each day the general rules for heart care (page 85).

With a consideration of the pulse irregularities now completed, we may at this point, midway between disorders of the heart and circulation, properly discuss angina pectoris. For its cause and underlying pathology can be located either in the heart or adjacent blood vessels.

ANGINA PECTORIS

Angina pectoris is the aristocrat of heart troubles.

Angina pectoris (pronounced an-jin-ah pec-toris), or as the phrase literally translates "strangling of the breast," is one of the oldest heart affections in medical history,

having been described by early Greek writers. Most brilliant of all the historical sketches is that of Heberden, an English physician, who wrote in 1768 of this condition. Indeed, no better description of angina pectoris could be given than to quote the classic phrases of Heberden.

"But there is a disorder of the breast marked with strong and peculiar symptoms, considerable for the kind of danger belonging to it, and not extremely rare, which deserves to be mentioned here at length. The seat of it and sense of strangling and anxiety with which it is attended, may make it to not improperly be called angina pectoris.

"Those who are afflicted with it are seized while they are walking (more especially if it be uphill, and soon after eating) with a painful and most disagreeable sensation in the breast, which seems as if it would extinguish life, if it were to increase or continue; but the moment they stand still all this uneasiness vanishes.

"In all other respects the patients are, at the beginning of the disorder, perfectly well, and in particular have no shortness of breath, from which it is totally different. The pain is sometimes situated in the upper part, sometimes in the middle, sometimes at the bottom of the os sterni (breast bone) and often more inclined to the left than to the right side. It likewise extends very frequently from the breast to the middle of the arm. The pulse is, at least sometimes, not disturbed by the pain, as I have had opportunities of observing by feeling the pulse during paroxysm. Males are more liable to this disease, especially such as have passed their fiftieth year. After it has continued for a year or more, it will not cease as instan-

taneously upon standing still, and it will come on not only when persons are walking, but when they are lying down, especially if they lie on the left side, and oblige them to rise out of their beds. In some inveterate cases it has been brought on by the motion of a horse or carriage and even by swallowing, coughing, going to stool, speaking or any disturbance of mind.

"Such is the usual appearance of this disease, but some varieties may be met with. Some have been seized while they were standing still or sitting, also upon first waking out of sleep, and the pain sometimes reaches down the right arm, as well as the left and even down to the hands, but this is uncommon; in a very few persons the arm has at the same time been numbed and swelled. In one or two persons the pain lasted some hours or even days, but this has happened when the complaint has been of long standing and thoroughly rooted in the constitution; once only, the very first attack continued the whole night."

The brilliant accuracy of Heberden's description, written in 1768, could be amplified today only by the substitution of automobile driving for carriage riding. It is not unusual that the driver of a car will experience his first attack of acute chest pain, when twisting the body to back a car in, as when parking.

THE PSYCHIC AND INTELLECTUAL BACKGROUND

Angina pectoris is largely a disease of the well-to-do and successful class, being only occasionally found in the ward patients of a hospital. And still more rare is its appearance among the population of insane asylums.

The very frequency with which angina pectoris favors the higher strata of society gives a clue as to the circumstances which set it in motion. Industrial leaders and business men, bishops and clergymen, judges and lawyers, professors and teachers, are among the persons possessed of intellectual accomplishment, dynamic drive, emotional repression and intensity of purpose, which characteristics furnish the psychic background for the development of angina pectoris at middle age or shortly after.

The occupational strain of Medicine makes a physician strikingly susceptible to angina pectoris, the majority of doctors in America dying of the disorder at the average age of fifty-six years. Perhaps this incidence is not so much a tribute to the mental attainments of physicians, as it is to their pitiable disregard of self when others call in distress.

As angina pectoris is peculiarly an affliction of the intellectual who arrive at middle life, it is also principally a condition affecting men, probably occurring six times as often as in women. Accounting for this may be the fact that women are not subjected to the business responsibilities, financial anxieties and to the struggle for supremacy that harass the hearts of men.

Angina pectoris may arise in early adult life, although such an incidence is rare. In these younger persons, its occurrence can very often be associated with severe infections and also with profound secondary anemias and other blood dyscrasias which have been neglected.*

After the age of sixty-five, true angina pectoris has its inception much less frequently than in the previous dec-

* See angina pectoris reference in middle age on page 56.

ade. The circulatory pains of later years are caused more often by heart muscle fatigue and not by the "typical strangling of the breast." As a general rule, the younger the patient the more severe and the more serious are the attacks. In older patients the seizures are tempered in severity and are less likely to compromise the future.

VARIOUS TYPES OF ANGINA

There is a group of symptoms (syndrome) by which angina pectoris is traditionally recognized. The group embraces (1) gripping heart pain, (2) an apprehension of impending calamity, (3) an arrest of motion as though riveted to a spot and (4) a radiation of pain usually to the left arm. The complete syndrome, however, is not invariably present. Any one of the four outstanding characteristics may be missing from a given clinical picture.

Angina abdominalis, for instance, is an example of angina's bizarre behavior. In this condition the pain is referred not to the pectoral (breast) region, but to the abdomen. The acute pain thus reflected may lead to the assumption that appendicitis or gall stone colic or some other abdominal emergency is present. Physicians are constantly on the lookout for such palpable errors in diagnosis, lest an actual angina patient be incorrectly advised to undergo an operation for the supposed acute intra-abdominal condition.

Angina sine dolore, or angina without pain, is another atypical form of the angina syndrome in which pain does not appear. Nevertheless, the person afflicted has other anginal symptoms, becoming suddenly motionless, being riveted to the spot at which he stops and being seized with

great apprehension. The picture is a familiar one on city thoroughfares, where an elderly gentleman ceases his promenade to gaze without seeing into shop windows until the seizure passes. Similar sudden arrests of motion when crossing a street are probably responsible for many automobile accidents to elderly persons.

Angina without pain is not the blessing which it at first would seem to be. There is something kind and considerate about pain, however severe it may be, in its warning of impending danger. Pain is purely a protective mechanism and is in no sense destructive. There are rare individuals, not to be envied, who are insensible to pain, who cannot feel its inhibitions and who therefore neither subside nor desist in obedience to its compunctions. Unannounced dangers beset their paths.

Angina without radiation of pain to a shoulder or arm is not unusual. The absence of such classic lines of pain transmission does not nullify the diagnosis of angina that is otherwise established. However, the absence of referred pain adds favorably to the outlook of angina pectoris.

The angina of effort is a term applied to chest pain that gradually evolves as effort is put forth and as gradually subsides upon the cessation of physical activity.

The angina of repose refers to the heart pain which gradually comes on in previously affected hearts that are obviously relaxed in tone. Relaxed heart tone explains why former athletes may be distinctly heart conscious in later years when at physical rest and only feel comfortable within the chest when moving around or otherwise physically engaged.

Pseudo angina, also referred to as "false angina," is

a term sometimes employed to describe angina that does not run true to form, as illustrated by any of the five bizarre types above recited.

The term "false angina" also may be applied to the heart pains and circulatory collapse of drug addicts which follow the peremptory withdrawal of habitual drugging with alcohol, cocaine, morphine, headache remedies and other coal tar derivatives.

The majority of "false anginas," as a usual thing, sooner or later will eventuate as true anginas and always should be regarded as genuine until proved otherwise.

THE MANAGEMENT OF ANGINA PECTORIS

Angina pectoris need not be the discouraging condition at which Heberden's classic description hints in rather disconsolate phrase, providing the one afflicted regards the first anginal pain as a friendly warning signal. A flash of chest pain should cause a person immediately to subside and desist in the mental occupation or physical effort that provoked the pain. The physician should be called promptly and after a period of rest and treatment every medical facility available should be requisitioned for the detection of hidden physical defects.

It happens very frequently that angina is caused by an unsuspected condition elsewhere than in the heart. Furthermore, an angina can be perpetuated or intensified by such coexisting circumstances as blood impoverishment, dental infections, kidney abnormalities, diabetes and even by ordinary gastro-intestinal disturbances which would not beset the heart in younger years. Therefore, the contribution that the patient with angina pectoris may

make towards his recovery is to continue in an unfaltering and unremitting pursuit of all bodily conditions that may retard the attainment of that maximum degree of general physical health, which is the safeguard in angina pectoris.

ANGINA PECTORIS OR CORONARY ARTERY INVOLVEMENT

For generations it has been known that angina pectoris is most variable in its behavior. One person may have a simple angina repeatedly over many years and be but very little inconvenienced, except during seizures that are brief or momentary. There are other persons in whom the first attack of heart pain may prove profoundly prostrating, initiating a prolonged and exhausting illness followed by a tedious recovery. This serious type now can be identified as acute coronary artery occlusion. It is of the utmost importance that the distinction between these two conditions be made on the first appearance of severe heart pain. Such early differentiation not only influences the immediate treatment, but also governs every future action of the patient.

These are some of the differences; he who has angina pectoris needs only to observe a modicum of care during the attacks and for a brief interval thereafter. Indeed, many men who have a seizure in the evening are fully recovered and sufficiently comfortable to insist on following their customary occupation the next morning. However, the man who is suffering from an acute coronary artery insult will not desire to leave his bed for many days, nor should he be permitted to arise for at least six weeks. The

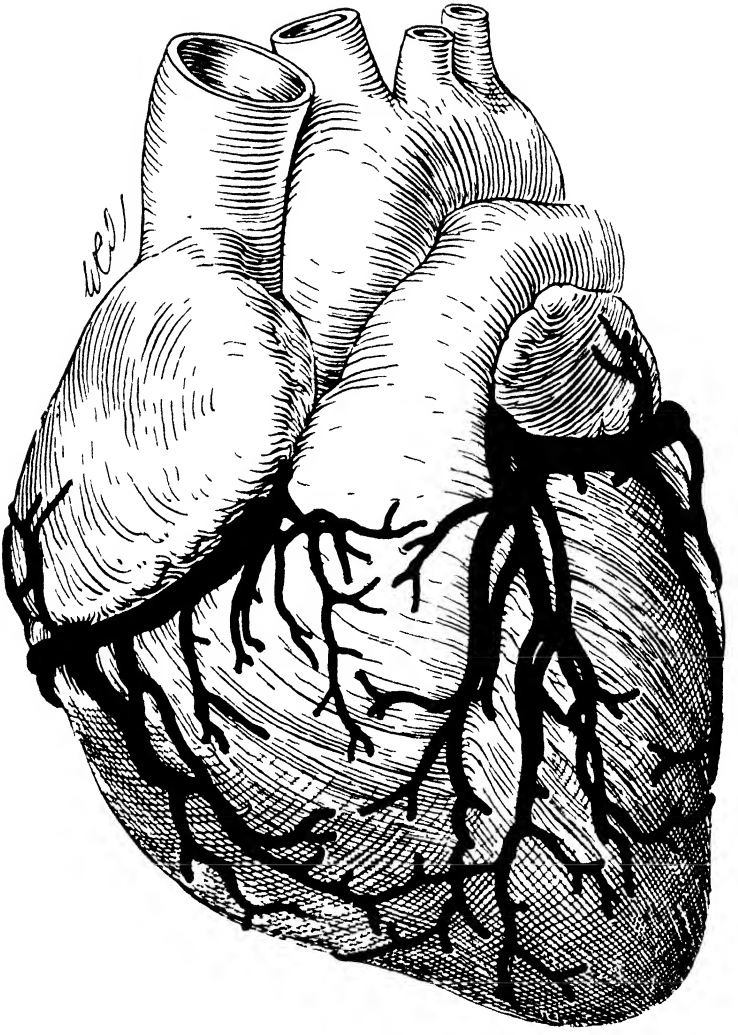

FIG. 4.—BLOOD SUPPLY OF THE HEART MUSCLE. The heart muscle receives its nourishment from the coronary arteries, not from the blood that passes through the heart chambers. (After Spalteholz.)

spasm of angina pectoris can be relieved promptly by simple remedies self-administered, which the doctor will prescribe. But the angor of coronary artery involvement requires the personal and repeated administrations of the physician and nursing care over several weeks of rest.

ACUTE CORONARY ARTERY OCCLUSION

The two coronary arteries supply the heart muscle—not the heart chambers—with blood. The two coronary arteries arise, each with an independent opening, from the large aortic trunk, within an inch of the junction of the aorta with the heart. Consequently, the right and left coronary arteries, which are about the size of crow quills, extend only a short distance until they enter the heart muscle. There the arterial branches ramify throughout the right side and left side of the heart respectively.

When the symptoms of angina arise, it frequently happens that one or the other coronary artery has become occluded. When the occlusion is gradual and only partial, as in the thickening and narrowing (coronary sclerosis) that takes place in all ageing arteries, there is but comparatively little interference with the heart's nutrition and the angina that ensues is brief and usually present only on effort. But when a coronary artery becomes acutely obstructed, tragedy is precipitated in that side of the heart thus deprived of blood, the angina is excrutiating and the patient desperately ill.

A coronary artery may be occluded by a spasm of the vessel wall, and it is possible for such a spasm soon to subside. Or a coronary artery or one of its many branches may be obstructed by a clot of blood. Whether occluded

or obstructed in its largest diameter or in a tiny branch, a coronary artery occlusion necessitates the tenderest heart care, in order to insure recovery and to prevent a recurrence of the affliction.

Acute coronary artery insult is the outstanding heart condition of adult life which requires the observance of absolute rest without any equivocations or reservations whatsoever. Usually after the first week of rest and medical treatment, the days pass so tranquilly and uneventfully that the patient feels sufficiently well to arise from bed and in the majority of instances will argue and contend with the physician in an effort to shorten that irreducible minimum of six weeks rest. There is no better way to combat this natural desire of an active man to force an early return to his accustomed pursuits, than to explain in detail the predicament in which his heart finds itself during and following an attack of acute coronary insult.

THE PRECIPITATING CAUSES

A seizure usually arises because the heart has been called upon to supply blood for emotional and physical demands that have extended over a period of weeks or months. The heart muscle at last has become fatigued in attempting to supply the incessant demand. There comes a moment when the overworked heart muscle requires of its nutritive sources, the two coronary arteries, more of a blood supply than they can at the instant deliver. Understand, these coronary arteries at fifty or sixty no longer possess the elasticity of youth. They have at this age, in all probability, thickened a bit and indeed are likely to be hardened to some degree on account of the intensive

physical or emotional life that so often furnishes the background for seizures of chest pain.

THE SUPREME DEMAND

At the moment of supreme demand or shortly thereafter, one of the coronary arteries goes into a spasm and its caliber is narrowed. Or it may happen that, from a brief collapse of the coronary vessel walls, a blood clot forms at the point of contact. In either event, that area of the heart, which was supplied with blood by the affected coronary artery, is deprived immediately of its nourishment. This gives rise to the instantaneous pain and anguish, which grips the heart as though it were seized in the jaws of an iron vise (stenocardia).

The pain is not a matter of moments, as in angina pectoris, but lasts for several hours, gradually wearing off in a day or two, although soreness may persist and become acute on the slightest movement over many days thereafter.

NATURE TO THE RESCUE

Whether the coronary artery has been occluded by a spasm of brief duration, or whether one of the coronary branches has been plugged shut by a blood clot, a duty immediately devolves upon the unaffected coronary artery. The unassailed vessel must not only supply its own side of the heart with blood, but it must arrange to send by roundabout channels a blood supply to the opposite side of the heart, which suddenly has been deprived of nutriment. This collateral circulation, or interlacing (anastomosis) may be established within a few hours; but

there dare not be any additional work thrown on such slender branching of the circuitous blood route, until it has matured and developed sufficiently to sustain the new demand. Weeks of rest are required for this repair and readjustment to a damaging circumstance.

LITERAL WOUNDS OF THE HEART

A still more arbitrary reason for absolute rest for the first few weeks exists in the fact that a rather serious situation may be developing somewhere in that section of the heart which was supplied by the now blocked coronary artery. A few cells, perhaps in the aggregate only of microscopic size, have been destroyed for lack of nourishment. The destroyed cells must be removed by the collateral circulation, so that the wound may heal by scarring. Or the area of heart muscle injury may be the size of a pea or a half dollar. There is no way of estimating the size or the depth of the injury inflicted; but that there was an injury is almost certain and the larger the area involved, the longer time must be allowed for its repair.

The question may here be raised as to what might happen in the wounded area, if the patient were to throw himself carelessly around in bed. Any minute within the first two weeks of the injury, there is a possibility that unnecessary work for the heart may cause the wounded spot to push through the thinned muscular wall beneath it, thus producing a bulging, throbbing sac that extrudes from the outside of the heart, called a ventricular aneurysm. When this accident happens, the prospect of

FIG 5.—X-RAY SILHOUETTE OF THE BLOOD SUPPLY WITHIN THE AVERAGE HEART MUSCLE Showing how the coronary arteries which nourish the heart, branch and subdivide into very fine arborizations (From "The Blood Supply to the Heart" by Louis Gross Courtesy of Paul B Hoeber)

ever regaining more than a modicum of heart strength becomes very discouraging.

ABSOLUTE REST IMPERATIVE

Therefore, in order to keep within a margin of safety, a minimum rest period of six weeks is absolute and cannot be compromised without imperiling the heart.

The minimum of six weeks in bed will be extended in case of any relapses or in event of a delay in the customary recovery. It also will be extended at the discretion of the attending physician should the patient's heart and circulation react unfavorably to the first attempts at effort, which attempts the doctor will superintend at the end of the six-week period of bed rest.

In all other acute heart prostrations, the period of lying in bed is determined by the absence of fever, pulse rate variations, the heart's response to exercise and other considerations, which the physician will evaluate. But in the heart prostration of acute coronary artery insult the period of bed rest is arbitrarily set at a minimum of six weeks, which now may be discussed.

SPECIAL INSTRUCTIONS FOR THE CARE OF CORONARY ARTERY IMPAIRMENT

The time in bed need not be irksome after the first three weeks of lying down are passed successfully. If the doctor then permits the patient to be propped up in bed at intervals, mild diversions, such as reading, music, brief occasional visits of intimate friends and similar harmless indulgences can be arranged to while away the tedium of the hours. Perhaps, the physician will allow the patient

to spend an hour in talking with a business associate or otherwise keeping in touch with his affairs.

So the period of sitting propped in bed after an acute coronary artery storm should occupy three weeks, rather than the five-day period set forth under convalescence on page 178, and the doctor may likewise extend the subsequent periods of convalescence to suit the best interests of the coronary patient.

There also will be abundant mental occupation in ordering one's future affairs. For when the patient is up and around again it will be necessary for him to lead a fifty per cent. life. That is, all undertakings are to be reduced to fifty per cent. of what the patient could accomplish ordinarily and the fifty per cent. of output thus saved is to be devoted to rest and diversion over a period of several months following the return to a customary occupation.

Just as there is a logical reason for insisting on rest, so there is a compelling argument for insisting on a life of only fifty per cent. capacity following coronary artery insult. If a man received an injury to the muscles of a leg, resulting in the formation of scar tissue and interfering with the functional activity of the leg, that man could never again run a race.

Likewise, when a man has been the recipient of an injury to one side of his heart, which injury resulted in the formation of scar tissue, it is foolhardy for him to attempt to run that fifty per cent. heart at the former one hundred per cent. efficiency rate. It of course may be argued that the damage to the heart did not involve a full

fifty per cent. of the total area. It is well that this is so, for the unimpaired area on the affected side of the heart constitutes a margin of safety, whereby the former sufferer from coronary artery occlusion has some cardiac reserve with which to meet the emergencies of future life.

INFLAMMATION OF THE AORTA

Inflammation of the aorta (aortitis) usually involves only the lining membrane of that large arterial trunk.

Aortitis induces at the top of the breast bone a dull pain, which is aggravated by effort, and perhaps a brassy cough with a sense of chest oppression.

The condition may arise acutely during influenza, may complicate rheumatic fever or may be a manifestation of cardiovascular syphilis. Aortitis may be permanently established by the continued trauma of an overacting heart that impinges the blood with tremendous force on the aortic arch, inducing a thickening of the vessel wall at the point of impact (atheroma of the aorta). The aortas of chronic alcoholics in bygone days were likely to develop protective thickenings of the aortic arch, which are known as calcareous plaques. Other circumstances which drive the heart inordinately also may produce aortic plaques.

Obviously, the patient with aortitis can contribute but little to its treatment, other than observing absolute heart rest during the acute stages and living abstemiously when afflicted with the structural changes that follow aortic inflammation.

ANEURYSM

An aneurysm (meaning a widening) is a sac formed by the dilatation of the walls of an artery and filled with blood. Most aneurysms are formed on the main arterial trunk, called the aorta. Therefore, an aneurysm may develop as a sequel of the several conditions that cause aortitis.

The chief symptoms of aneurysm are the formation of a pulsating tumor, a thrill over the swelling and pressure symptoms, consisting of pain and paralysis from pressure on nerves and erosion of those nearby structures on which the pulsating swelling may press.

The detection of an aneurysm does not at all imply that it will progress to the stage of rupture. Care, modified living, medical supervision and time can arrest and may indeed so improve the situation that the aneurysm becomes more than ever what Nature might well have intended it to be, a safety device. For usually it is not long after an aneurysm develops until Nature takes steps to actually thicken the bulging vessel by depositing therein a mattress of fibrin whipped from eddying blood, which acts as a cushion and buffer for the onrushing stream that otherwise would have broken through the damaged vessel wall.

THICKENING OR "HARDENING" OF THE ARTERIES

Thickening of the arteries (arteriosclerosis) is as natural a process as is the advance of years.

The arteries,—more particularly their capillary termi-

nations—begin to undergo structural changes in all people when they are in their thirties. Gradually as the years come on, the alterations, once microscopic, involve larger capillaries, producing the circulatory changes that in aggravated instances constitute the impaired heart of middle life. As the burden of living accumulates through the ensuing years, the large superficial arteries become involved, such as those of the wrists, neck and temples. The thickening of these vessels can be appreciated by the sense of touch and is called hardening of the arteries, a term that naturally alarms many persons when they first hear it applied to their own blood vessels.

Occupation plays a large part in producing an increased arterial resistance. A mechanic, who uses his hands excessively, will show an occupational thickening of the arteries of his wrists before he is forty. A postman, who walks inordinately, will have thickened arteries in the legs when in the thirties.

The arterial thickening of later years of course imposes a load on the circulation; but the load starts early in life, from an imperceptible beginning. It accumulates so gradually as the years advance that the circulation has abundant opportunity to adapt itself to a burden which, were it thrown in full maturity on the circulatory apparatus, would undoubtedly break the heart. Furthermore, Nature adapts advanced life to impaired arterial structure in the deliberate physical movements and the mental tranquillity with which declining years are blest. Violation of the tranquillity and composure, which Nature has ordained for advanced years, may result in the rupture of inelastic vessel walls within the skull and then there occur the

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apoplexies and the paralyses that ensue from pressure which the extravasated blood makes on brain cells.

Arterial thickening, then, is to be expected as the years come on, the degree of involvement depending upon occupational over-use of various bodily structures. Thus any organ, which has had excessive demands thrown on it during the active years, may show outstanding impairment in the fulness of time. For example, the practiced writer's hand may tremble, the thinker's mental processes may lose their one time brilliancy and the hearts of those who rode the crest of life's emotions may thicken in their capillaries to a degree far in excess of the burdening years (cardiosclerosis).

The treatment of arterial thickening cannot be directed to relieving the condition. Treatment should be addressed to relieving the circulatory load by frequent daily rest, by attention to diet and elimination and by medical supervision.

CONCERNING BLOOD PRESSURE ESTIMATES

Much consternation is caused by the phrase "high blood pressure." The person to whom the term is applied is unwarrantedly considered by his friends as being afflicted with a vital malady and even may be regarded as a candidate for sudden death. No appraisal could be more absurd nor farther from the truth.

High pressure readings or low pressure readings may be natural and fully compatible with an excellent degree of health. Or, when considered with other physical findings which are unnatural, the pressure readings may be part of the picture of bodily impairment. "Blood pressure"

can be nothing more than a sign or symptom and in itself is never a disease. Let us inquire further into this alleged malady, which has gripped the imagination of present-day America.

Physicians of older days estimated the force of the heart's contraction and the degree of arterial resistance by employing a discriminating hearing and an appraising sense of touch. In those days the pressure of the blood was said to be high or low, allowance being made for the age, occupation and stature of the person, as well as for the illness which prevailed at the time. Kidney conditions made the pressure of the blood seem high; tuberculosis gave the impression of lowered pressure. In olden times there was no thought of attempting to forecast the future of a person's health and even his very existence solely from appraisals of the blood flow.

Within recent years an instrument (sphygmomanometer) was devised for estimating the blood pressure. It has been widely adopted by physicians and life insurance companies. So nowadays the figures of a calibrated scale, rather than the clinical sense and experienced judgment of the older physicians, is used to appraise the pressure of the blood.

Blood pressure estimates show wide normal variations in a group of persons who are well and healthy. The fluctuations depend on whether the individual is young or old, male or female, thin or fat, lazy or active, reserved or excitable, dull or interested. Even in the same person there are definite fluctuations in the readings as the physiologic activities of rest, exercise, eating and thinking proceed throughout each day's accustomed life. There may be a

difference of eight or ten points in pressure between the right arm and the left, and the difference in pressure readings between an arm and a leg may be sixteen or twenty points.

Even though the blood pressure estimate is high, it does not always signify disease. High pressure may be an indication that the individual is developing a resistance to an acute infection. There are other persons with blood pressure readings around one hundred and eighty whose health at that level is much better than when the pressure drops to one hundred and fifty. Estimates which show the blood pressure to be low may indicate a conservation of vital forces on the part of Nature.

Finally, blood pressure findings are very often of a familial type. Three generations of one family may show low readings in the neighborhood of one hundred and ten systolic and sixty-eight diastolic. The members of another family may show the higher range of pressures, such as one hundred and fifty systolic and ninety diastolic, both groups equally active and apparently equally healthy.

When there are such wide variations within the limits of health, it is little wonder that each day finds distracted persons who are trying to ascertain the meaning of blood pressure findings and who seek to know what future significance is to be attached to the figures registered on the calibrated scale of an instrument. There are many reasons why the inquiry cannot be given an offhand answer.

Sphygmomanometry, or the estimating of blood pressure, is of value in the scientific practice of Medicine only when the figures obtained from the instrument are considered in their relation to other factors and other de-

monstrable circumstances that coexist in an individual, who is in poor or failing health. Without the consideration of such associated conditions, blood pressure readings are meaningless and no importance or significance can be attached to figures separately considered.

When a physician speaks of the systolic blood pressure, he refers to the maximum pressure point of a pulse wave as it courses through an artery. In speaking of the diastolic pressure, he refers to the lowest pressure point occurring just as the pulse wave disappears in the pressure of blood that is maintained in the arteries between beats.

Manifestly, when the systolic pressure is very high (hyperpiesis), it may indicate overaction of the heart or increased arterial resistance in other structures, such as the kidneys. But the findings cannot be regarded as being indicative of heart disorder or kidney disease, unless there be other evidence pointing to involvement and dysfunction of these organs. Blood pressure estimates, then, are only one of the many evidences of abnormality which must be confirmed by findings elsewhere in the body.

When the systolic pressure is very low (hypotension), the contraction force of the heart may be weak. Or the heart may be in excellent condition; but the arteries of the extremities may be so relaxed that the systolic reading is low. Here again, other studies and investigations must be conducted, and if the body is found normal in all other respects, then the isolated low pressure readings can be disregarded, just as can the higher systolic readings in the absence of confirmatory conditions. The person may then assume that his readings of high or low blood pressure are

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an individual characteristic and probably as fully compatible with future health as with past health.

A question that is almost invariably asked by a patient is, "What should my blood pressure be?" As the reader has already surmised, there are so many variations of health that there can be no exact figures stated for normal blood pressures of any given age. There once was an idea that the blood pressure reading should be equal to the patient's age plus one hundred; but this theory has been so frequently disproved that it has become only a legend. An ideal blood pressure reading for any adult of any age would be one in which the systolic readings range around one hundred and twenty to one hundred and thirty, the diastolic estimates being around seventy to eighty.

Insurance companies now regard systolic pressure estimates that are constantly and persistently maintained at one hundred and fifty or more as requiring close scrutiny As a group, the companies also regard doubtfully diastolic pressures that are sustained at readings of ninety or over. While it may seem extreme to regard with disfavor blood pressure readings that vary so little from former "normal standards", nevertheless by so doing insurance companies confer a personal favor on the applicant who presents such findings. The individual thereupon becomes aware of a condition, the possibilities of which can be investigated and the future significance determined by periodic health examinations.

Many of the diseases that beset existence are accompanied by high or low blood pressure readings. These diseases are also accompanied by high or low ranges of temperature, by high or low pulse rates, by a high or low

count of blood cells, by increased or decreased quantities of kidney excretions. Not one of these extremes of high or low, in and by itself considered, is an indication of disease. Each must be appraised in its relation to other evidence before a diagnosis of disease can be made.

As might be supposed, there is no treatment for high or low blood pressure findings. The treatment, which the doctor will institute and the advice which he will give the patient who persistently presents the unusual findings, is directed to the correction of the underlying malady or disease which produces the unusual readings. If the heart be at fault, heart care must be instituted; if the kidneys be directly affected, a suitable diet will be suggested among other things. If a disease such as syphilis or tuberculosis underlies the increased or lowered blood pressure figures, then rest, diet and medication will be prescribed as the judgment of the physician dictates. The patient's only responsibility is to comply with instructions.

NERVOUS AFFECTIONS OF THE HEART

The Nervous Heart: The heart can be temporarily influenced by vagaries of the nerves which control it, either by the pneumogastric (inhibitory) nerve or, as is more often the case, by the sympathetic (accelerator) nerves, thus inducing what is colloquially referred to as "the nervous heart."

A person with "nervous heart" has no structural alteration whatever in the muscle nor in the blood vessels; nor are the symptoms and signs constant. The heart rate is rapid and on this account the individual is continually tired and incapable of putting forth sustained effort with

out developing a pain in the chest. There are no circulatory symptoms that cannot be accounted for by the distraught and frankly apparent nervous condition. The person with a nervous heart often gives the impression of being tense, trembling and quivering,—like a bird poised for flight.

A nervous heart is seen in people who are constitutionally below par and obviously anemic or visibly distressed in mind, as revealed by their anxiety, mental exaltations or depressions and exaggerated physical movements. Prostrating grief and an unconsolable frame of mind may induce a nervous heart, and one rather expects to find it exhibited during the menopause. Great business responsibilities, periods of financial reverses and sometimes even the necessity of preparing and delivering an after dinner speech may develop a nervous heart in men.

Manifestly, the treatment for a nervous heart is directed to the correction of the underlying nerve derangement. The part that the patient may contribute towards a restoration to customary health is the cultivation of a composed and tranquil mental attitude. Without the patient's sincere cooperation in this regard that uncomfortable but comparatively harmless condition known as a nervous heart may be perpetuated indefinitely.

ASSOCIATED WEAKNESS OF THE NERVES AND CIRCULATION

Neurocirculatory asthenia, a term which defines an associated weakness of the nerves and circulation, is a heritage from the World War where it was coined to describe

the inefficient hearts and unstable nerves of American recruits.

In the British Army the above symptom group was called "D. A. H.", or disordered action of the heart; but Irish physicians interpreted the symbols "D. A. H." as meaning "desperate affection for home", which indeed described the mental attitude of the constitutionally inferior recruit, who was inclined to fight against arms rather than with them.

In the Civil War the army surgeons of 1862 spoke of the weaker brother in the ranks as having soldier's heart.

In the World War Cantonments, the green recruit on admission was entirely free from physical defects. He had been drafted from walks in life where his occupation had been of a sedentary nature; perhaps, he was a desk clerk, an office worker, a department store employee or a type setter. His heart was fully sufficient to meet the accustomed demands of his daily life; but when the first few weeks of army training threw upon his unpracticed musculature the necessities of hiking, drilling, marching double time and quick step, while carrying either a rifle or thirty-five pound knapsack or both, the recruit was unable to withstand the physical demand and fell out of line with a pale face, blue hands, mental apprehension, racing heart, trembling nerves, utterly unmanned by the enforced muscular activity. Naturally, such physical reaction bred a profound distaste for the discipline of army life and this mental attitude served only to increase the disabilities of the would be soldier.

Such men were put in developing battalions, where by

graduated muscular activities their unpracticed hearts were trained to a natural exercise response. The men also were carefully examined for hidden conditions which might be contributing to the circulatory weakness, such as abscessed teeth, infective tonsils, anemia, gastrointestinal disturbances, etc., which, when found, were eradicated and the bodily training continued. After an interval of from six weeks to three months, the once physically inferior individual was able to bear arms and take his place as a creditable soldier in the army.

Peace hath her neurasthenics as well as war. Neurocirculatory asthenia is created nowadays by business demands on men and social requirements that devolve on women in ever-increasing frequency. Needless to say, in such persons there is no organic defect which threatens the future nor which indeed impairs the present existence, excepting when a heavy mental or physical load is thrown on a partially undeveloped body that is unpracticed in withstanding such demands. Manifestly, the treatment for neurocirculatory asthenia, occurring in middle life, is just such gradual development as proved successful in reconditioning the nerve-shattered army recruit.

SLUGGISH CIRCULATION

"A sluggish circulation" is a phrase that occurs in every day language, without any parallel condition so far appearing in scholarly medical literature. Physicians have been rather inclined to regard the term "sluggish circulation" as perhaps implying circulatory failure; but recent studies in the dynamics of the circulation reveal good sci-

entific grounds for believing that there actually exists a form of circulatory weakness which can be described as a "sluggish circulation."

To illustrate: In a healthy person the circulation of the blood never hesitates, neither at the central pumping station, called the heart, nor at the peripheral or terminal distribution, called the capillaries and venules (see page 14). Circulatory failure may arise from one of two causes. If the central circulation fails to distribute an adequate blood supply, then heart failure is present (see page 130). But when the peripheral circulation fails to distribute blood, then vessel failure is present, which we are now about to discuss.

In some persons of impaired vitality, where the heart is perfectly normal, there may be a sluggishness of the circulating blood at the peripheral distribution, such as in the vast vascular network of the skin, and the skin then becomes a depot for the slowly moving blood. The blood in the depot is not properly oxygenated. The person feels languid, tires easily on slight effort, is incapable of sustained exertion and is likely to be short of breath, because that part of the blood volume which is in the sluggish periphery does not flow with normal rapidity to the lungs. That is one reason why massage benefits a person who has a sluggish circulation. The massage reestablishes the tone of the capillaries and venules, which increased vessel tone relieves the congestion of the depot. The circulation quickens and the blood moves on to the lungs, is properly oxygenated and the patient feels gratefully improved as result of the massage.

"NEURALGIA" AND "RHEUMATISM" OF THE HEART

There are two phrases current in the household language of a past generation, called respectively "neuralgia" and "rheumatism" of the heart. The terms are mentioned here only to set forth the fact that nowadays there is no such definite type of impairment as "heart neuralgia" and "heart rheumatism."

Probably the misnomers had their origin in the neuralgic twinges and muscular pains that occur in the muscles of the breast, in the muscles between the ribs or in the nerves that course around the chest under each rib. For example, that affection of the nerves and skin called "shingles" may, before it puts in full appearance, be referred to as "neuralgia of the heart."

The mild toxins from dental abscesses or tonsillar infections, which affect the nerves and muscles in any part of the body, may be located in the chest and thus regarded as originating in the heart. Or a sprain of the various shoulder muscles, as in reaching for a telephone or when swinging a golf club, may cause unwarranted apprehension that the heart is affected.

"Neuralgia of the heart" may be a phrase selected by a patient to describe the lightning-like or vise-like pains of angina pectoris or a coronary artery impairment, in which case the physician will clarify the diagnosis.

"Rheumatism of the heart" likewise may be employed to describe the dull, heavy aches of a tired or overtaxed heart muscle. But "neuralgia" and "rheumatism" of the

heart as clinical entities are not recognized by cardiologists.

ENLARGEMENT OF THE HEART

Enlargement of the heart may be actually present or may only seem to be. It may be one of the many physical signs of heart impairment or it may be natural and not inimical to health.

Enlargement of the heart is purely a relative term and its presence is determined by estimating the transverse diameter, or width, of the heart as it lies in the chest. A heart that is wider than usual does not always mean heart enlargement. Other things must be considered. For example, a short stocky individual may have a heart that exceeds by an inch or two the customary measurements of heart width. If his chest be unusually shallow from above downwards, the heart will seem to be even wider, because it is situated in the chest more horizontally than obliquely. If the thick set person is engaged in heavy physical labor, the heart under such circumstances might extend from the right side of the breast bone almost to the left arm pit and this would seem to be enormous enlargement of the heart. Yet there need be no heart enlargement whatever, as the seeming increase in heart size is due to stature, build and occupation.

Again, some families transmit for generations hearts that are large and broad. Other persons who are tall and slender have undersized hearts that are situated longitudinally in the chest. These sometimes are spoken of as "dropped hearts", a phrase which would have no more bearing on health than if the person were accused of hav-

ing an elongated nose. Thus heart enlargement is a relative term and not always incompatible with excellent health.

Another instance of natural heart enlargement occurs as one advances in years. The skeletal muscles of elderly persons lose their firmness and tone and because of relative disuse have a tendency to shrink. The muscle called the heart also loses its firmness and tone, but the heart must continue to work regardless of the muscular impairment that comes as the years advance. So a perfectly natural enlargement of the heart ensues as one grows older, first demonstrable perhaps in the early forties.

Unnatural heart enlargement occurs in youth as a result of continued overstrain. Normally, the heart in young adult life decreases rather than increases in size on effort, as shown by x-ray studies taken before and after exercise. But continued overstrain may eventually produce the increase in heart size called athletic heart (page 34).

Serious forms of heart illness, occurring at any time of life, may produce enlargement of the heart as a complication of the illness due to overstrain. Such heart enlargement does not always persist in after life and sometimes may subside as the once prostrated heart is gradually reeducated to withstand the demands of effort.

Chronic valvular disorders of the heart also may bring about an increase in size, over what would probably have been the normal transverse measurements of the heart afflicted, thus constituting the heart enlargement of chronic valvular impairment.

"Dilatation" and "hypertrophy" are terms that were formerly used to denote an increase in heart size. Dilata-

tion referred to an increased capacity of a heart chamber. Hypertrophy denoted a nutritional overgrowth of heart muscle. Manifestly, such morbid conditions cannot be definitely identified during life, and the terms are giving place to the more accurate phrase enlargement of the heart, which can be due either to natural or morbid causes.

Heart enlargement that is natural in young or elderly persons of course does not require treatment. Where the enlargement is part of a morbid process, the contribution that the patient may make to the physician's treatment of the underlying cause is the observance of such rest and other measures as the doctor may prescribe.

This chapter so far has sketched the more frequent disorders of the heart and circulation, and has shown under various descriptions how the patient may contribute to his recovery.

When the illness has been of the more serious type, producing acute heart invasion or heart prostration, the patient will require further detailed instruction concerning the ways in which he personally may contribute to his full convalescence and ultimate recovery.

DAYS OF EARLY CONVALESCENCE AND RECOVERY

Waiting for the acute phase of an illness to subside is usually neither irksome nor tedious to the patient. There is about prostration a veiling of the mind to the slowly dragging hours, and there is a resignation taught by discomfort and pain which cultivates in most patients a graceful acceptance of the situation.

Finally, a day will come when the evening tempera-

ture rise disappears and when there are no twinges of pain on attempted motion. The patient is as one cast from storm tossed seas upon the shores of health. The doctor will wait for the passing of five or seven days of such freedom from signs. Then the time for convalescence has arrived. The heart now must be reeducated to withstand the demands of effort by very gradual steps.

Recuperation will require three weeks, which can be divided into four progressive stages of five days each. Three weeks from the first day of sitting up in bed to walking outdoors is the minimum time required in which to reeducate the worn heart to a normal exercise response. Nature may take longer than that to restore a heart; even an abscess on the neck will not heal completely within three weeks from the time its active symptoms subside. So the doctor may decide that some stage of convalescence (which means "growing strong") requires a longer period than the theoretical five-day stages hereinafter set forth, which begin with sitting up.

(1) Sitting in Bed: For the first few days that have passed since the fever subsided the patient probably has been permitted by the attending physician to sit up for the brief intervals of meals. Now to develop strength the patient should sit propped up in bed for perhaps an hour in the morning and an hour in the afternoon, gradually lengthening the time in event no unpleasant sensations arise over a five-day period.

Massage morning and evening should be instituted, not for the purpose of freshening the skin as during the acute illness, but with the intention of stimulating the muscles. Preceding this gentle kneading and exercising of the

muscles, a tepid bath can be given and the massage followed by a brisk alcohol rub.

Meals should be of the semi-solid variety and should conform with the tastes and desires of the patient, with the larger meal at midday. Proteins should be limited in quantity and only gradually increased, as the kidneys may have developed an intolerance for proteins. The principal dietary caution to be observed, during the period when the patient is sitting in bed, is to avoid overeating. The patient should always cease eating when he feels that he could easily have partaken of more. This precaution, together with deliberate chewing of starches, will largely prevent the occurrence of disturbances in the partially unpracticed gastrointestinal tract, disturbances which might mechanically oppress the heart by the formation of gas. For this reason, it may be better to have five small repasts a day.

There is no scientific basis for omitting salt and thereby rendering the food unpalatable, nor is there any reason why the patient's customary use of seasoning and even condiments should be restricted. The food to be nourishing and digestible should be appetizing and gratifying to the taste.

If the patient is accustomed to drinking coffee, he should have it, preferably without cream for the first few days, if that satisfies his taste, as the addition of cream may make the coffee indigestible to susceptible stomachs. Milk should be given only when relished by the patient and never in large quantities, unless very slowly sipped, for there is a possibility that milk may form an undigestible curd when retained in the stomach for any length

of time. If the patient is really fond of eggnogs, he of course may have them. The concoction should not be forced on sick people, as there is no scientific proof that an eggnog is as easily digested and highly nutritious a food as claimed by folklore.

Small amounts of alcoholic liquors may be taken at mealtime, if the patient is accustomed to their use. Alcoholic beverages are usually of benefit to the heart. If liquor is not desired with meals, it may be taken at other intervals during the day, if there are no conscientious scruples, and no medical objection to alcoholic beverages, as might be were the stomach or kidneys involved.

In all heart affections but one, if the patient previous to the illness has been accustomed to smoking, the first smoke or two may be indulged in on the first day of sitting in bed; but should be discontinued if any reaction, other than pleasure, results.

The one heart condition in which the reemployment of tobacco should be debated seriously is angina pectoris. There is little doubt that smoking is likely to aggravate and prolong an attack of angina pectoris. The contribution of tobacco to the aggravation of chest pain finds expression in what some physicians consider to be a distinct clinical condition called tobacco angina. On the other hand, there is an occasional patient who is absolutely convinced that he can abort an impending attack of angina pectoris by smoking. So the question seems to be one for individual experiment and deduction.

Diversions: Reading, which of course was prohibited when the patient was recumbent, may be indulged in when the patient is sitting in bed, as may also writing. Music

is a pleasant diversion and so are radio programs of the nonirritating type. Many men are annoyed by radios in their sick rooms.

The ban on visitors may now be lifted and one or two social callers admitted. It is still too early to permit business callers, telephoning or card playing, except for a game of solitaire. Thus there comes to a close the customary five-day period of sitting in bed.

(2) Sitting in a chair: The first excursion out of bed is to a comfortable chair, where one can recline with feet partially elevated, in the same room, pleasantly located near a window or in the sun where the patient can relax. On the first day, as much as an hour in the chair in the morning and an hour in the afternoon may not be taxing. The time of being up can be lengthened at each sitting for a five-day period.

Meals may now consist of the food served to the family, plus any special dishes for which the patient may have a particular desire. If there is one time when individual preferences should be followed in the selection of food, it is when a person is recovering from an illness which probably has consumed many of the chemical stores of the body, which stores can best be replaced by the individual's food selecting instincts. Of course, in the presence of stomach conditions, diabetes, kidney involvement, etc., the diet may be restricted accordingly by the physician. But here we are speaking alone of convalescence from heart prostration and instinctive food selections will hasten a return of heart strength. The only reminder is that one should never gorge food, especially

during the days of physical delicacy which constitute convalescence.

As interest and vitality accumulate, restrictions are removed gradually and callers, if the patient desires callers, are permitted, as are telephone conversations, card games and even conferences with business associates or secretaries for an hour in the morning.

Always there must be the noonday physical rest and hour of mental relaxation. The early to bed and late to rise precept must be followed faithfully.

As to exercise, the renewing of activities during the chair period of convalescence constitutes sufficient exercise, in addition to the daily massages.

A commode at the bedside will be appreciated by the patient, particularly if the type of heart illness necessitated the use of a bedpan, such illnesses including the acute stages of myocarditis, endocarditis and coronary artery obstruction. In coronary artery obstruction, however, the patient may recover so rapidly and be free so early of acute symptoms that the patient may demand the privilege of a commode, asserting that only in a natural and accustomed posture can he bring into play the muscles of the abdomen and the laws of gravity that secure a normal evacuation. The physician must decide this question from his knowledge of the particular illness.

However, if the coronary patient, who is free from acute symptoms, will arise slowly and deliberately to a commode and avoid straining while there, and if he will slowly and gradually ease back into bed, the risks of the excursion will be minimized and perhaps more than compensated

for by freedom from intestinal accumulations and resultant gastrointestinal disturbances, which may develop when a bedpan is used. Again, it must be emphasized that the decision in this matter depends solely upon the judgment of the attending physician.

(3) About the room and on one floor for the next five days permits the patient to have more physical liberty, whereby to practice and develop his muscles. These days can start with the physical exercise of stretching various groups of muscles, when one awakens and while still on the back in bed.

The legs can be extended slowly from thighs to toes. Next, the legs can be flexed and the heels drawn toward the hips a few times. Deep inspirations should always be practiced as the effort is slowly put forth and exhaling as the muscular contractions are relaxed and returned to the original position. Likewise, the arms can be stretched outward from shoulders to fingertips and they, in turn, slowly flexed, bringing the fists to the shoulders. As one lies on the back, the muscles of the shoulders and thorax can be contracted and rotated, as can also the muscles of the hips.

Some recovering patients supplement these simple stretching exercises by turning repeatedly from one side to the other. This performance may bring on dizziness or twinges of pain and is not to be recommended, any more than is lifting of the feet high in the air nor the dragging of the upper body from the prone to a sitting position. Also to be avoided are many accustomed calisthenics, which the patient formerly employed and which

included stooping, crouching, straining, reaching, lifting and head bending.

Deep breathing exercises are of considerable heart value during convalescence. Long, deep inspirations for a five-minute period, near an open window, without at any time holding the breath, aid in oxygenating the blood, increase the lung capacity when some degree of lung congestion has been present and mildly massage the heart by the inspiratory excursions of the lung tissue adjacent to the heart. Three or more times a day is not too often to indulge in the refreshment which follows deep breathing as a convalescent exercise in most heart patients.

The convalescent will secure additional exercise by walking from one room to another, always on one floor and avoiding stairs.

Tub baths now are permitted for the first time since the illness began. Cold showers and hot baths present two extremes of temperature, which are not desirable and which unnecessarily may shock or relax the convalescent.

The convalescent should not stand while shaving. If the patient be a woman, her coiffure should be arranged by another, rather than to have her arms held overhead in the drawn out procedure of brushing and arranging the hair.

Diversions may now be increased, as may also business relations that can be conducted at the patient's home.

(4) **Downstairs and Outdoors:** Following five days of sitting in bed, another five days of sitting in the chair and five days of being up and around on one floor, with the steady progress uninterrupted by setbacks, the con-

valescent now is ready to assay the stairs. The descent involves no risk.

The day's sojourn downstairs will be made convenient by the providing of a couch and toilet facilities. The convalescent of course will join the family at the midday meal, spending the afternoon on the porch, if the weather be propitious.

Ascending the stairs must be a studied performance. They should be climbed only once a day, either before or after the evening meal, as dictated by returning strength. The banister is made to take some of the weight in stair climbing, and a pause should be made for a moment every third or fourth stair, in order to lessen the heart load of the climb. On reaching the bedroom, the convalescent should promptly lie down before attempting any further effort.

Thus the three weeks of convalescence have passed and with returning strength and interest in life, the former patient now starts promenading outdoors, weather permitting. The distance at first should be one block. On pleasant afternoons the distance should be gradually increased, together with the length and vigor of the stride, until one or possibly two miles constitute the total for a day. Walking in the face of a wind is to be avoided, as is also walking uphill.

Motoring as a passenger for comparatively short distances of course is advisable; but long journeys of several hours hard driving should not be attempted. Naturally, the former patient should not yet endeavor to drive his own car.

At this early stage in recovery, one should not attempt

golf or other games and diversions requiring physical effort, until such a time as regained stamina has been demonstrated by several mornings at customary employment.

The erstwhile patient is now fully recuperated and again able to attend to the affairs of life. From now on, the general suggestions for heart care, as set forth in Chapter VIII, should be sufficient guide for daily life. Former occupation, activities and diversions of course will be modified in the future and suggestions along such lines are set forth in Chapter X. Thus the one-time heart patient can so arrange his affairs that he continues on a happy, contented and efficient existence.

CHAPTER X

THE PSYCHOLOGY OF RECONSTRUCTION

> My son, in thy sickness be not negligent; but pray unto the Lord, he will make thee whole;
>
> Then give place to the physician, for the Lord hath created him; let him not go from thee, for thou hast need of him.
>
> There is a time, when in their hands there is good success.
>
> —*Ecclesiasticus*, 38.

Now that you know you have heart trouble—now that the first psychic shock of the revelation is over, what are you going to do about it?

Are you going to take a constructive mental attitude and thank your lucky stars that your heart was kind enough to flash those signals of approaching danger across your path, or are you going to descend into the depths of a blue funk and make everyone around you unhappy by your own unhappiness?

It is an outstanding fact that the man who knows he has heart trouble will take care of himself and live indefinitely throughout the years, eventually dying of something else and usually at a ripe old age. The man who does not know of the condition of his heart is the one who

rushes blindly past warning signs into sudden and unexpected disaster.

Heart trouble? There is no occasion for panic. Use your head. Stop right here and take a little inventory of yourself. You are not a bit worse off today, since the doctor made his pronouncement of heart trouble, than you were yesterday or last week or last month. You have existed fairly comfortably throughout the past weeks when you did not know that heart trouble was developing. Now that the doctor has made his discovery not a thing has transpired to change your condition, unless it be that you allow yourself to develop the mental attitude of apprehension.

Perhaps fear has suddenly paralyzed your powers of constructive thought. The doctor who found the heart condition may have alarmed you by his seriousness at the moment, or by his noncommittal replies to your agitated questions. Whatever its cause, you must without any delay immediately begin your conquest of fear. Why be fearful?

You will continue to live through today and tomorrow, just as you did through the yesterdays, and as the days and weeks succeed upon each other, you will live more abundantly. For from now on you are in a position to take care of your heart and increase its efficiency.

You are really very lucky. The man who knows he has heart trouble will restrict his physical expenditures, conserve his heart resources, build up reserve assets through the proper interweaving of rest and exercise and thus continue to live happily, contentedly and efficiently, despite his heart handicap. The future of a person with a troubled

heart depends entirely upon the cultivation of a wholesome mental attitude.

As a man thinketh in his heart so is he.

If his thoughts are of sickness, his presence, his atmosphere, his very gait will be sickly. But if a man who is sick at heart will keep his malady within his chest and out of his head and off his tongue, his fortitude will cheer those about him, his courage will inspire others, his resolution will sustain his own spirits and his mind, untrammelled by thoughts of wretchedness, will be free to continue radiating the charm and personality that won him his world of friends. And one must consider his friends.

AVOID COMPLAINING

There is no human being alive who is not depressed by a continual discussion of sickness and recital of symptoms. Therefore, do not talk about your condition and do not issue exhaustive bulletins describing in detail exactly how you feel at the moment of inquiry. Discuss your condition only with your physician. Regardless of his affliction, a man who permits himself to be dejected and miserable will soon drain dry the sympathy of even his family and the atmosphere of the home will become unbearable. Do not for one moment allow your family, friends and business associates to assume from your conversation that you enjoy ill health. There are disconsolate people of this type who moan continually of death and dying, but they never die. We sometimes wish they would.

Truly the Psalmist must have known both the optimistic and the pessimistic type of heart patient when he wrote

"A cheerful countenance maketh the heart glad, but a broken spirit drieth the bones."

Above all, do not advertise your malady. Just a few years ago heart trouble was held in universal dread, for Modern Medicine had not then proven it to be what it is now, a preventable and remediable condition. It happens that most people nowadays still cling to the old fashioned idea that heart trouble means wheel chairs and chronic invalidism. Therefore, imagine the damper thrown on a young man's future by his whispered confidences that he has heart trouble. Would any business regard his membership therein as an asset? Would insurance companies issue policies to protect the future of that business? Picture, too, the effect on an established institution when everyone knows that the president had a heart attack; are investors likely to be attracted by the stock of a concern whose success has been built around his dominant personality? Think, too, of the effect on the younger fry in the business, who are looking for the first opportunity and for a really legitimate excuse to shelve the old man and get his job.

For the sake of the business do not advertise your malady! You're feeling fine! Tell them you never felt better in all your life.

THE UNMANAGEABLE TYPE

There is another type of sick individual, not so objectionable as the chronic complainer, but infinitely more harmful to his ultimate best interests. This is the iron man,—dominant, dynamic and dictatorial, allegedly full of vim, vigor, vitality, virility and vitamins. This asser-

tive person loudly proclaims that he has nothing the matter with him and has not the time to be sick; he called the doctor only because his family insisted that he should; in his opinion doctors do not know anything anyhow, etc. So the man himself proceeds to manage his illness. There is not much that can be done for this sort of person except to let him run amuck until old Dame Nature gives him a powerful wallop, after which the iron man becomes—sometimes too late—submissive and tractable.

SELF-PITY

Self-pity is by far the most destructive influence that can beset a sick person. It may initiate an illness, it may thwart all measures for relief and it may be an unrecognized obstacle to convalescence and thus perpetuate an illness into indefinite years.

Self-pity is an insidious emotion that is rather to be expected, and hence to be guarded against sometime during the course of a heart affection. Self-pity is the cloud that obscures the sun of hope and casts the heavy shadows of apprehension, anxiety, worry, fear and dread over the path of convalescence.

Not one man in a thousand will admit that he is indulging in self-pity to even the slightest degree. The man acknowledges that of course his heart illness causes him some apprehension regarding his business, anxiety concerning his family, worry over his possible dependence, fear relative to his finances if he be incapacitated, dread of his physical limitations that may be a heritage of the illness. Observe that in every one of these mental reac-

tions there is the constricting inhibition of self-pity. Note how the element of self enters; his business, his family, his finances, his physical limitations. It is something of which he, himself, may be deprived; therefore he pities himself.

Convalescence from an illness is a delightful experience to the person who adopts a philosophy of cheer, hopefulness, peace and tranquillity and who takes no thought of the morrow. Today is the tomorrow we worried about yesterday.

Resignation and acceptance will restore more hearts than will all the digitalis that flowers. Calmness and poise are the soil in the garden of the soul on which tranquillity thrives. Self-pity, once rooted, is a noxious weed of rapid overgrowth that chokes the bloom of budding health.

For health's sake man, stop feeling sorry for yourself!

PLANNING THE FUTURE

These are your days of reconstruction. The doctor is in charge at this moment. Incidentally, you are not going to try to make any compromise with his initial instructions. Follow directions implicitly during this period of rest. The doctor is intent on getting you back to business just as soon as he has proven it is safe for you to return. So you and he both have the same interest at heart. And now that you are resting and have plenty of time to think it over, let us set about this business of reconstructing your future.

Plan your work and work your plan. Of course, some curtailment in your activities will have to be made both as concerns business and pleasure. A few retractions are

in order. Some activities may have to be abandoned. This will seem a bit hard at first; but you certainly have sufficient mental resourcefulness to adapt yourself to a curtailed program, which should eventually mean actually increased efficiency. It is not so difficult to give things up, once you have resolved to do so. You have been adjusting yourself to new circumstances all through life. Now you must again employ your adaptability and resolution.

Playing marbles and spinning tops at one time dominated your existence, and yet you abandoned both, even the old boyhood gang, to enter other fields of endeavor. The enchanted days at college came regretfully to a close. Then again when you left the daily associations of the old home town, your heart was heavy. All through life you have adapted yourself to changing situations, and now that you have heart trouble do not waste any sympathy on yourself because you must again reorder your plan of living. Things now precious will slip out of your life with as little future regret as you gave the playing of marbles and the spinning of tops. This is a new game, —your living within the limited capacity of a once affected heart. Play the game like a sport.

CONCERNING RETIREMENT AND CHANGE OF OCCUPATION

Do not plan to completely retire from business. There is no one more forlorn than a once active man who finds himself without an occupation. The judge who abandons the court room for the farm; the business executive who leaves the accustomed routine and associations of his

organization to devote his hours solely to diversions; the retail merchant who retires completely from the familiar demands of his accustomed day to wander aimlessly in search of something to occupy his mind, all soon lose their zest in living and the dragging days seem purposeless. It is far better to keep one hand on the helm. Partial retirement of course is necessary; but to utterly abandon the accustomed performances and associations of life will sooner or later create a dejected mental attitude, which can only aggravate the heart impairment.

Nor should a former heart patient delude himself with the thought that a complete change of occupation will further the best interests of his heart. The necessity of learning anew the ins and outs of an unfamiliar position is always a mental, if not a physical, strain. Furthermore, one may be a misfit with new associates. This, plus the way one misses the old friends of the old job, creates a psychic depression that will nullify the benefits alleged to be derived from the less strenuous new employment. A man past middle age finds it very difficult to change his business without some loss of prestige and with a probable reduction of income. None of these circumstances can further the best interests of the heart. So do not for one moment consider absolute retirement. Do not seek a new position. The old job is the best job.

CURTAILMENT OF OCCUPATION

On returning to your customary business, you should for the first few months lead a life of only fifty per cent. efficiency. This means that your activities are to be cut in half, thus allowing the other fifty per cent. for addi-

tional physical and mental rest. If your occupation necessitated the climbing of stairs, from now on you will use the elevator or send someone else to do the stair climbing. If your employment requires you to be on your feet continually throughout the day, you will have to make some arrangement whereby such a circulatory strain can be relieved by sitting.

In adapting your former position to your new circumstances, you should omit or reduce to a minimum the physical necessities of climbing stairs, continually standing, running, lifting, reaching, crouching, stooping and stretching. These are the activities that bring on heart attacks.

If your days were spent in stormy business conferences or at directors' meetings, where argument and contention prevailed, such harassments must be reduced to a minimum and be cut down more than fifty per cent.

If your evenings were spent at social gatherings of various kinds, surely you can abandon such unnecessary drains on vitality and employ the time thus gained in additional rest or diversion. If you were so necessary at various social committee meetings that you cannot be excused from attendance, you should peremptorily resign from membership. Prompt resignations are probably best, for they will spare you the importunities of fellow members, who otherwise will prevail upon you at every opportunity to return.

Some solicitous friend is going to express the idea that you have turned hermit. You can answer this sally by replying that you expect to return to the meetings later on when you have the doctor's full permission to do so. A man must be selfish when his future physical comfort

is at stake and save his heart by absenting himself, rather than save an organization by attendance.

Such time as you feel you dare devote to committee meetings, etc., should be spent at those gatherings which have a direct connection with the perpetuation and advancement of the business from which you procure your living.

CURTAILMENT OF DIVERSION

Now to the consideration of pleasures and diversions: Only those which entail an excessive expenditure of physical energy or mental effort should be curtailed. Otherwise, entertainment and diversion should be increased rather than decreased, for both are of tremendous value in creating pleasant, healthy, natural mental reactions which reflect beneficially on the heart. Curtailment may mean only an hour at golf rather than an afternoon. If you find a session at bridge too stimulating, allow yourself to be enticed for an hour, but not for an entire evening. If there is a reception, a theatre party or a dance on for the night, you will prepare for the event by taking a longer rest than usual the preceding afternoon, and compensate for the evening's expenditures by staying in bed the following morning. After all, the whole régime seems to be simply a matter of using your head to protect your heart. You will recall what was said concerning heart rest and the saving of beats on page 79.

Strenuous and competitive games, such as tennis, handball and other forms of violent physical exercise are out. Throw the hand paddle away,—you are through with the racket game from now on. Avoid all forms of effort

which require you repeatedly to reach, lift, stretch, stoop, crouch or strain.

LESS SPEED AND LESS EMPHASIS

AVOID BURSTS OF SPEED! A dash for a trolley, a race for a train, bounding up subway stairs and chasing for a taxicab, are all examples of dangerous physical bursts of speed. Do not forget that wrangling, argument, contention, the delivery of orations and the practice of elocution call for emphasis and all may constitute bursts of mental and emotional speed, and are therefore to be avoided.

Cultivate repose in your physical bearing and tranquillity in your attitude of mind. From now on, you will find that it is better not to notice a slight, a rebuff or a criticism, which you naturally would resent. For resentment and indignation frequently bring on attacks of heart pain. A dominant man who had recovered from a heart illness, expressed his new found philosophy in such matters by the following sentence: "I find I have to compromise a great deal, have to make a few excuses and have to tolerate much that is distasteful. But I prefer that my antagonists shall hurt my pride rather than my heart."

THE OLD GAME IS THE BEST GAME

Whatever your previous physical exercise has been, talk it over with your doctor and ascertain what modifications should be made. It is best to adapt the old game to the new situation. If you were a golfer, perhaps you now need only to avoid playing on hilly courses. If you were accustomed to swinging Indian clubs, you should

no longer swing them over your head. Maybe you were expert at billiards; continue to play, but from now on do not stretch across the table for long shots; use the rake.

Walking or motoring should enter into each day's recreation. So should horseback riding, providing of course that you know how to handle a horse. Do not start to be an equestrian unless you are familiar with the feel of the reins. It requires too much exertion to learn at your age the new art of horsemanship. And thus throughout the world of sports certain modifications may be made, which will allow you to continue playing the old familiar practiced game.

The idea is not that you should abandon or ruin your accustomed pastime. Far from it. The object is simply that you shall modify familiar exercises in accordance with the limitations imposed by recent heart hurt.

It may happen that you are a man who has given such close attention to business that you have never taken up outdoor exercise or indoor sports. If that is the case, do not adopt some physical exercise simply because an enthusiastic friend recommends a particular form of exertion as keeping him in such fine fettle. This is scarcely the time to adopt someone's fetish or to follow his lead, unless you feel within you that compelling incentive called an urge which impels you irresistibly to the exercise. Lacking an urge for outdoor sports or games, you will continue in the future, as in the past, to secure your relaxation in your customary ways, such as walking.

WALKING FOR HEALTH

When you walk put some pep in it. Walking for health is more than mere self-propulsion, more than a purely

mechanical alternate advancement of the legs. There should be a swing to the stride, a sprightliness to the step that rolls energetically forward from heel to toe, and the muscles of shoulders and forearms should be in rhythmic swing with the time of the stride. Thus you will be walking for health and healthy for walking.

FRESH FIELDS OF THOUGHT

Now that you are readjusting prospective activities, do not fail to consider the future exercise of the mind. Perhaps, you have always thought that when time afforded you would take up the study of music, maybe delve into literature or study some art, craft or branch of science that always appealed to you. You will now have plenty of leisure in which to adopt this new mental recreation, especially since fifty per cent. of the time which you had formerly spent in the maelstrom of business is now to be devoted to more tranquil pursuits. Perhaps, you would like to try your hand at writing short stories, or you may have a yearning for woodcarving, or for the lighter jobs of a carpenter's work bench where the fragrance of yellow pine would be a balm to your business-wearied spirit.

By such measures as have been outlined in this chapter, one can reconstruct his future so that he may live happily, contentedly and efficiently. There may be moments of discouragement, for rehabilitation does not always proceed in an uninterrupted advance. And if there is a failure to progress or even a setback for a day or two during convalescence, a man can regain his courage, his fortitude, his resolution and raison d'être by reciting to himself these indomitable lines:

Out of the night that covers me,
Black as the pit from pole to pole,
I thank whatever gods may be
For my unconquerable soul.

In the fell clutch of circumstance,
I have not winced nor cried aloud,
Under the bludgeonings of chance,
My head is bloody but unbowed.

It matters not how dark the gate,
How charged with punishment the scroll,
I am the master of my fate,
I am the Captain of my Soul.

—*Henley.*

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