

**Exercise  
and Food for  
Pulmonary  
Invalids**

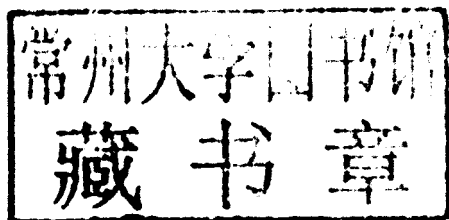
**Charles  
Denison**

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# EXERCISE AND FOOD FOR PULMONARY INVALIDS

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Charles Denison



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EXERCISE AND FOOD

FOR

PULMONARY INVALIDS

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Denvek, Colorado

Professor Of Diseases Of The Chest And Of Climatology, Uni

Versity Of Denver; Ex-president American Climatolog- Ical Association; Author  
Of "the Rocky Mountain

Health Resorts;" "the Climates Of The

United States, In Colors;" "THE

Preferable Climate For

Consumption." And

DENVER

THE CHAIN and HAEDY CO.

1895

These two essays have elicited considerable commendation from brother physicians. My patients, too, have seemed to need just such an opportunity as here presented, to study into the important aids to cure. The necessity of much talking on

the part of the physician is avoided, and it is well for the invalid to transfer so much of the advice given from the consulting office to his own home and kitchen. I have, therefore, been led to believe this combined issue would meet a popular demand.

The "rest cure" is mujli. in oqua. jusbaty. presfnt. There are also nmgiyvtviyljsis llandevan decry filft/V li. Vather vaguely), the exercise afelwellr astlte "htgn-alftrucle treatment of consumption. I wish, therefore, to say that I feel the responsibility of thus defending physical development in disease. These pages are written advisedly, and are backed by a certain right on my part to speak with some authority on the subject of exercise, as well as of food, for invalids. In college I was an instructor in gymnastics, and afterward having neglected exercise I came to Colorado an invalid. So personal experience and the advising of over 3,000 invalids in Colorado seem to warrant some positiveness on my part.

The dedication of this little volume is to the many living examples of the benefits furnished by the observance of the principles here imperfectly expounded.

CHARLES DEXISOX. Denver, January, 1895.

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EXERCISE  
FOR  
PULMONARY INVALIDS.  
Revised Edition  
EXERCISE  
FOR  
PULMONARY INVALIDS.

I Believe it was Artemus Ward who proposed to get up a new life insurance company to insure people only while they were "in bed." He had looked into the matter extensively, and found that almost everybody died in bed, so he concluded that was a dangerous place.

As usual with this genius, there was some wisdom in his wit, for sedentary life and respiratory inactivity are undoubtedly largely explanatory of the preference tuberculosis shows for the pulmonary organs. Why is it that consumption is so often "of the lungs," and not at first, at least—of the rest of the body?

1. Is it because of the non-use of certain portions of the lungs, the apices (tops) particularly, in chest-Read before the Congress of Medico-Climatology of the Worlds Fair Congress Auxiliary, June 1, 1893, and printed in response to a resolution of the same.

bent clerks and flat-chested people of sedentary occupations?

2. Does consumption come by preference in the lungs because the circulation of blood there, in the capillaries, is normally five times as rapid as in the periphery of the body, and therefore any stagnation of this movement, made proportionally worse by any lessened excretion elsewhere as in the skin, liver, bowels, and kidneys, must result in unnatural conditions, inimical to the health of those delicate parts? Is it true that imperfect circulation has so much to do with the pretubercular state as the above supposition would seem to indicate?

3. Is it because catarrhal conditions in the pulmonary air cells and bronchial tubes, caused by colds, influenzas, or lung engorgements, when not thrown off by good

lung ventilation, furnish specially favorable culture beds for the multiplication of tuberculosis germs?

4. Is it because the ordinary breathings of sedentary people only remove a tenth at a time of the air the lungs contain, and those portions of the lung apices and periphery, farthest from the large tubes, are so little disturbed that they become vitiated and retroactive in the self-poisoning process through which the individual passes?

5. Is it because the bacillus of tubercle needs some such vitiated climate, be it the stagnant, imprisoned air or the chemically changed secretions, in order to multiply most prolifically, until it is even possible to find, as we have done, a thousand germs to a small fly-speck of sputum?

6. Is it, as I have conceived it possible, because bacillary growth and reproduction are sooner inaugurated by the process of alternating rarefaction and condensation in these bacilli-laden air cells, a process synchronous with and due to the respiratory acts—inspiration and expiration? That is, that the septic juices which precede the germs, or the spores of the germs themselves, are churned into a quicker existence, perhaps somewhat as butter is made by the agitation of cream?

7. Or is it, as for all that I know I may be responsible for supposing, that the pulmonary air cells are the natural durning-off places, where through the agency of the leucocytes, nature intends to do the cleansing of the blood of such impurities as these invading bacilli? These leucocytes, or white blood corpuscles, are known to be able to carry the bacilli of tuberculosis, embraced within their delicate bodies, through the attenuated alveolar (air cell) walls. Therefore, as the contents of these air cells in active tuberculosis are seen by the microscope to be made up almost wholly of these two, leucocytes and germs, is it not reasonable to infer that these carriers, and scavengers of the body brought the bacilli there?

8. Or finally, does consumption by preference come in the lungs because this course is natural in the delicate meshes of the pulmonary structure, so wonderfully endowed with capillary vessels and glandular tissue? Because directly where the interchange from heavy venous to light arterial blood takes place (the process of hrematosis—blood making—in intervacular and intertubular spaces) nature finds the best places to arrest the invading bacilli by her own protecting agencies? Among these agencies are the leucocytes, whose "policeman function" enables them to arrest, and then to build fibroid (new tissue) encasements around, the invading enemy.

Nature, ever bountiful in her provisions and generously replying to the unsatisfied demands of continued irritation, undoubtedly overdoes this pasting in and shutting off these bacilli until whole lobules and lobes become involved in this extradition process. Thus those suburban regions of the lungs, naturally suited for the purpose, become the burying ground of these conquered (?) bacilli. This is in accord with post-mortems, where the lungs apices, periphery, and peribronchial spaces are found to be crowded with these bacilli-filled prison vaults and encapsulated products. This process is often seen to be advanced even to the total annihilation of the respiratory functions; so that the affected portion of lung is, even during the life of the person, only a little better than dead.

Settle as you will this question why tuberculosis attacks by preference the lungs, whether you answer in the affirmative one or all of these eight questions, or consider



these explanations as variously applicable to different cases, you must come to the decision that it is natural elimination which is interfered with, and it is healthful respiration which is wanted. It is action as opposed to stagnation. It is prevention of any further mischief which is the cure. It is cleansing as opposed to bacillary life. The time and opportunity for rest, as in the repair of disabled machinery, is not granted to the respiratory organs, especially not now when they are charged with a double function, that of supplying oxygen to the blood and of purifying the system of these bacillary and septic foes. The germs, when not encapsulated and so prevented from growth or restrained, multiply in geometrical progression, perhaps quicker when harbored in the warm and constantly moving lung than when quiet elsewhere.

If it were not for this, to the individual, unconscious opposition on the part of nature, humanity would be shortly blotted out from the face of the globe by this infinitesimal enemy which Eobert Koch discovered.

In this fight of life against lives, it is one against billions, maybe; but intelligence is, or ought to be, on the side of the one. To that one, great possibilities of muscular and respiratory power are granted, indicative of healthful resistance and elimination.

It is a man's living cell, his own vitality—his selective and eliminative forces—which must be "toned up" to a natural and healthful standard. Then bacilli cannot find a home in him. This is the function of exercise, especially with reference to the respiratory organs,—to enable one to feel that all his powers are "up to par," that every muscle and fibre which tend to make up a full-chested, symmetrical man, are daily brought into play.

Let it be distinctly understood that, in recommending exercise for invalids, acute and active inflammatory conditions of the lungs are excluded. I am referring particularly to the after-effects of such accidents as these acute conditions, and to the faulty states incident to or productive of slow encroachments of pulmonary tuberculosis. High fevers have a cause, perhaps previously undetected, and, of course, demand rest and soothing treatment. Pneumonias and pleurisies have to be fought by the aid of enforced rest to the respiratory organs; and pulmonary hemorrhage can sometimes be mechanically stopped. It is, indeed, "an ill wind that blows nobody any good,"<sup>7</sup> and hemorrhage from the lungs has proved "a blessing in disguise" to many a young man, including the writer hereof, by temporarily throwing him off his feet, and giving him an opportunity to seasonably and fully appreciate that there was a latent demand in his system for a change in his environment and physical activities.

#### EXERCISE AS COMPARED WITH OTHER PREVENTIVE AND REMEDIAL TREATMENTS FOR PHTHISIS.

Even before a bacillary cause of consumption was understood, it was generally recognized by medical men that the affected human organism must be helped to itself throw off the disease. There has been no defensible excuse given for the nonsensical and crazy idea of sending consumptives to live down in the natural cave in Kentucky, that they might have the benefit (?) of an equable temperature; nor of the almost equally hazardous plan of housing patients in dark rooms without any ventilation for fear of a draft. The value of an active life out of doors, associated with generous diet, has always been recognized by the best medical men. But the object of foods specially suited to combat tuberculosis—such as the Salisbury meat diet, fats and oils,



with or without stimulants—is in exact agreement with the effects of systematic and adapted exercise. Through the former there is a generous and proper supply to meet an unnatural waste, and through the latter a competent circulation and a muscular tone to keep up a normal elimination. It must be, indeed, a peculiar accident which will result in natures harboring tuberculosis in and physically perfect human being. But accidents will come and perfection to meet them is very seldom or never found. For this reason are we doctors! When we come to consider remedial measures under the head of medicines, we have to acknowledge that the most of them that are of any use are of the same nature—appropriate foods either for the wasting tissues or for the depraved nervous force. Such are cod liver and petroleum oils, hypophosphites, and some mineral tonics.

As to drugs, how unsatisfactory they are! To be sure, we can neutralize excessive fermentation and aid digestion. We can also aid elimination in different ways, as, for instance, by large hot water flushings of the bowels when indicated, as is often the case; by the use of mercurial and other inunctions; and by oxygen inhalations. However, these are all substitutes for what ought rather to be accomplished by systematic hygienic care of the body with exercise as a leading feature.

As to saturating the system with antiseptics so thoroughly that the tubercle bacilli may not be permitted to live and thrive while the human being harboring them mat/, the thing is probably impossible. It is to my mind doubtful if creosote, one of the latest fads in medical lore, has any more effect upon the invading bacillus than to neutralize its ptomaines—the septic results of its having already existed. This, if it were not for upsetting the digestion, is, of course, salutary. It is better to accept the inevitable and to trust to the individual cell of the man, strengthened by symmetrical development, to the end that a healthful and vigorous respiratory and circulatory system be maintained.

Quite as important is the possibility of substituting exercise for certain other methods of treatment, known or believed to favor the natural encapsulation, and so quietus, of the bacilli. I refer to the hypodermic use of such combinations as the cantharidates or chlorides of different bases—as the double chloride of gold, or of iodine also (on the Shurley-Gibbs plan.) The hardening and shrinkage of tissues around tubercular infected spots in the lungs, which seem to be the temporary local effect of such methods, is somewhat like the effect of appropriate exercise, and like the results seen of exaggerated respiratory activity in high altitudes.

The importance of exercise is not lessened, but increased, when we come to consider the use of Professor Kochs tuberculin, or of either Klebs or Hunters modifications of it. Here, to a new healing propensity, not unlike, but in exaggeration of, that already described as due to the chlorides of gold, etc., is added a natural stimulus—an immunity effort on the part of nature which is the most wonderful discovery in recent medical history.

A complete understanding of this process has not been reached, but a close clinical observation of its effects along natural lines brings exercise to the front as an invaluable aid to this natural method of cure. This is most reasonable; for while we do not

yet know the per cent. of tubercle bacilli which are killed by this process of immunization, the shrinkage of the affected lung tissues probably leaves the germs in the intervening or included spaces. These spaces must then be more or less open

in the spongy lung because of the shrinkage mentioned. It is suicidal to do this only and then stop, or by forced inactivity of the respiratory apparatus to allow these germs to remain in conditions undoubtedly more favorable than before for reinfection and reproduction.

Exercise, commensurate with these specific effects, is the *fiitte qua non* of success. Hence, one important reason why better results have been achieved with tuberculin, tuberculocidin or antiphthisine in high altitudes than at sea level, especially more than in any hospital practice, is because life in high altitudes is an imperative and continued activity of the respiratory apparatus. There is to me a peculiar significance in the harmony of effects of altitude, hill-climbing, and tuberculin reaction upon slightly affected areas of lung tissue. The dryer, harsher, louder, and more tubular breath-sounds locally distinguished during the first few weeks treatment are quite similar under all three of these conditions. During his recent visit to Colorado I was pleased to hear Dr. C. Theodore Williams of London say, as we were examining a patient who had been assiduously climbing hills at eight thousand feet elevation, that he had frequently noticed in the altitude cure the character of respiratory sounds heard in this case, to which I had called his attention as being similar to the tuberculin reaction sound.

All the most valuable attributes of climate in the cure of consumption—the sunshine and dryness, the lessened atmospheric pressure and electric stimulation—are in their results in perfect accord with exercise. The peculiar dry air of interior elevated sections has the same effect through a more rapid lung action favoring the abstraction of heat and moisture from the fevered and catarrhal lung; the rarefied air and electric tension are in themselves most important stimulators of respiratory gymnastics. The mountainous configuration of most high places invites to hill climbing, and the increased radiation of heat due to rarefaction and dryness is a natural incentive to, or substitute for, exercise. These agencies are to be preferred because they are natural; and besides the enforced observation of artificial rules is less imperative in high altitudes.

#### BREATHING EXERCISES.

The practice of inhaling medicines properly comes under the head of respiratory exercise; so much so, that I very much doubt if the atomized antiseptics, or whatever is inhaled, have had the good effect ascribed to them; but rather the effect has been due to the respiratory gymnastics necessitated in the process of inhalation. The truth is, except in the upper air tract, the medicaments have not ordinarily reached the infected portions. The fibroid process of healing, in other words the encapsulation of tubercle, which is the most prominent feature of the natural arrest or chronicity in lung tuberculosis, tends to close or shut off the affected portions from the inhaled air. In this protecting policy the whole lung is more or less implicated, and the inspired remedy usually goes with the inhaled air to the unaffected lung on the other side. For this reason a great deal of the inhalation treatment, so popular with certain specialists, is utterly useless; or by irritating sound lung areas is positively harmful. In this way the utility of the "Howe tube" is explained, which the Rev. Dr. Buckley, of *The Christian Advocate*, has done so much to popularize because of the good it did him. The principle involved is the secret of a peculiarly successful form of respiratory gymnastics. The idea is to inhale freely and fully, but to exhale with effort

and restraint, or with some obstruction to the out-going air. Thus the density of the expansive air within the thorax is so much increased that it will work its way into areas of lung where otherwise some air cells would be unused but for this prolonged effort.

Again, some congestion or infiltration may still remain in out-of-the-way lung spaces were it not for the push given to the blood circulation by the increased pressure of this pulmonary air, which (during this forced expiratory effort) is in marked contrast to the rarefaction existing there during inspiration. This process of breathing is much like the natural stimulus of altitude. If assiduously practiced, it is an invaluable exercise.

It has been my own effort and purpose to make this principle adjustable to the needs of different invalids, and combine it with an inhalation chamber in convenient size and form to carry in the vest pocket and thus be always ready for use. The result of considerable experimenting is the Inhaler and Exhaler here illustrated. The first cut gives the actual size and form of the instrument as made wholly of hard rubber, and the second the interior mechanism.

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THE INHALER AND EXHALER.

The control of the medicated air inhaled is illustrated as follows (see cut): f -T1!  
CNT;

/1 850 HI

f)ft

INHAL, NT I

The air enters the Inhaler through nozzle "A," which is purposely made for the possible attachment of a rubber tube connecting with an oxygen tank, any desired vaporizer or gas generator. In the box "B" covered by cap "C" is the Absorbent "D," made of corrugated blotting paper a little smaller in size than the inner calibre of the box. This is intended to hold and gradually disseminate the various combinations of germicidal and healing oils, or other evaporating substances which may be used in this process.

The inlet valve "E," governed by screw head "F," may be reached by unscrewing the mouth piece "G" from the instrument. The inlet valve closes with expiration so that the inhaled air has to go off through the exit valve "H," which in turn is made adjustable by screw top "I." This constitutes the most important feature of this device. By the control of the exit valve, from 1-10 to (5-10 open, the tension of the air in the lungs may be increased at will from easy to difficult according to the need and ability of the user.

In using, the valves are supposed to have been adjusted to suit a given individual's strength (or as usually used, inlet valve "E" three-quarters open and outlet valve "H" three-quarters shut), the plug from nozzle "A" removed, and the absorbent "D" in box "B" semi-saturated with any-desired inhalant. If the inhalant accompanying the instrument is used (specially designed for chronic lung and throat cases, perhaps tubercular, and composed of Pinol, Menthol, Phenol, Formaline, etc.) a partial saturation only once in four to six days will answer. The proper way to use the Inhaler is to Draw Long Full Breaths through the mouth-piece "G," the chest meanwhile being expanded and shoulders thrown well back. Then, without removing the instrument,

Exhale Into It With Force so that the entrance valve "E" closes with expiration, and so continue to Exhale till all the air possible is removed from the lungs.

It is intended that this kind of use shall be forcible enough to redden the face of the user, and constant enough (say five minutes out of most of the waking hours) to keep open those air cells which through weakness or disease have a tendency to close, and to keep the affected lung area as nearly aseptic as possible. Besides, it is evident that such use favors hasmatosis (arterial blood making) by driving the oxygen in on the blood. The general results, particularly the gain in pulmonary ventilation as shown by increase of the spirometer and manometer records of the lung capacity and strength of an invalid, prove this to be one of the very best forms of pulmonary exercise, especially where bacillary complications are feared or known to exist. I believe that this form of exercise, with healing vapors thus introduced to the pulmonary seat of disease, is not to be compared with trying to reach the mischief by dosing the stomach. It is hoped that many young men and women may thus avert tubercular disease, especially in the lungs, and that this method of exercise, so similar in its results to those of the high altitude cure of consumption, may be made available to many in the lowlands who are unable to profit by the rarefied air cure.

Though this Inhaler and Exhaler has been in use only a short time, several hundred invalids could, if desired, bear witness to its grateful effects and beneficial results in their own cases. Having been completed since this paper was first written, it is introduced in this revision as made and for sale by the Denver Surgical Instrument Company, Denver, Colorado. Other and ordinary methods of inhaling in *voirue* are most of them opposed to the principle of distension of the lungs here advocated. The inspiration through a medicated sponge, muslin or packed gauze device, obstructing the act like nasal obstruction, has a tendency to draw together the air cells, and there is no after exercise effect to counteract this contracting influence in the lungs. Consequently, while the affected lung seems to be freed of catarrhal secretions by these faulty inhaling methods, the diseased parts are left in a shrunken state, i. e. worse than before. In obstructed fibroid and catarrhal lung affections the inhalation should be free and the exhalation intensified by increased air pressure within the chest.

Of course the opposite condition to this atelectic or fibroid shrinkage state is sometimes, though not nearly so often, found, namely, the over-distension of the lungs with air as in emphysema and bronchi-ectasis (dilatation of the air cells and bronchial tubes). For this condition of general emphysema I have devised a form of exercise which answers well its purpose to remove the stagnant pulmonary air and retained secretions and promote better circulation of both air and blood in the lungs. It is called "77 e Chest Exerciser, or Emphysema Jacket," and is here briefly described.

It consists of a corset made to buckle or lace to

the shape of the chest in front, while behind it is left open and each half is fastened by straps to rollers on the opposite side of the body, which rollers, by attached levers, are worked by the arms of the user in consonance with inspiration and expiration. During inspiration the arms and the levers are moved back, relaxing the corset, but during expiration the thorax can be squeezed to any desired extent by carrying the levers forward. -Expiration, which is mainly at fault in these conditions, is thus chiefly influenced and made more nearly complete and sufficient than before. This process

is intended to be used intermittently, say for fifteen minutes three or four times a day, until the distended air cells and bronchial tubes regain somewhat their normal resiliency.

#### LUNG VENTILATION, CAPACITY, AND STRENGTH.

How do we know there is a lack of ventilation of the blood and of air in the lungs? The foregoing reference to the fibroid or contracting tendency in affected lung tissue furnishes an answer, and shows the great utility of recording the semicircumferential movements of the two sides of the chest. They are so seldom alike in lung disease that it is of great advantage in diagnosis to note that rare circumstance. The explanation comes by noticing the difference of these two movements under forced inspiration and expiration when comparing the records of the Spirometer and Manometer. These instruments respectively tell, for the first named, the capacity in cubic inches of air exhaled, and for the second, the strength of an individual's pulmonary organs by the pounds pressure or millimeters of mercury force (mm.) shown in an extreme expulsive effort. My aim has been to bring these instruments to points of such excellence and cheapness that every one, layman and physician alike, can use them. The accompanying cuts (pages 25 and 26) are fair illustrations of the results of efforts made.

#### THE SPIROMETER.

##### STANDARD VITAL CAPACITY TABLE.

Computed from 5,000 observations (Hutchinson) of healthy persons, standing, while making a full expiration into the Spirometer after a complete inspiration. Gymnasium Record of 2230 Amherst College Students (Males).

Height. Males. Females. Height. Males. Females.

4ft. 7 in. 49 411 50 515 25 35 4126 142 158 166 174 182 100 198 88 104 120  
128 136 144 152 160 5 ft. 5 in. 206 214 222 230 238 246 254 262 168 176 184 192  
200 208 216 224 194

56 57 58 59 510 511 00 210 224 240 256 270 286 302

As adjuncts to respiratory gymnastics they are of great value, the manometer being a means of lung development of no small account. Its habitual use causes a steady and positive improvement in the strength of the lung tissue. Emphysematous persons, much affected, should not use it save for purposes of diagnosis.

1. A positive defect in lung condition may be shown because the Spirometer and Manometer each record a marked deficiency for the height and sex of a given individual, women recording usually 20 to 25 per cent. less than men.

#### THE DENVER SURGICAL INSTRUMENT CO.

2. Again, in a given case the Spirometer may show a normal lung capacity, while the Manometer record is so markedly deficient (40 to 50 per cent.) that not only is insufficient lung strength inferred but a reasonable suspicion perhaps aroused of some local disease either in the heart or lungs.

3. Again, the Manometer record may be good or show an excess of the normal force, while the Spirometer record is less than one-half what it should be for a healthy person. This is probably

#### THE MANOMETER.

because of pleuritic or one-sided fibroid shrinkage, the result of disease. The inference is that the lungs have in a measure healed and gained the strength manifested even in their closed up condition. This is a compromise between health and disease, though nearer the former than the latter, with which exercise has very much to do. In fact, there would be no such arrest with the re-establishment of vigor except through the agency of respiratory gymnastics.

Therefore the means of measuring and judging of ones respiratory capacity and strength are of great importance. If much deficiency or inequality of movement of the two lungs is found, it is much better for a young man to go to a good diagnostician and have his respiratory organs overhauled than to wait until he has to do so because of actual or progressive disease. Too often it happens that the lassitude and inability to exercise which is incident to disease, becomes constitutional, so to speak, and a habit of laziness gives feeble will-power to carry out any system of healthful respiratory exercise whatever. We thus come to recognize the great need of some incentive, either of pleasure or duty, to the end that the whole of the respiratory organs may be systematically used.

The writer once, on a declamation day, received the characteristic commendation of that most excellent college president, the late Mark Hopkins of Williams: "The young man has a good conception of what he wants to do." I wish I could impart a "good conception of what he wants to do" in the way of exercise to each one of the thousands of young men and young women whose sallow complexions, feeble circulation, short breathings, round shoulders, and flat chests betoken the depraved blood state which is already marking some portion of their lungs as the seat of the future bacillary battle ground. Let me make it a personal matter with each one who, because of past, existing, or approaching respiratory disease, needs light or medium gymnastics as opposed to heavy or severe gymnasium work. The object sought is a man normal in all his physical make up, and not individual feats of dexterity or muscular strength. For such a one I will formulate certain rules and forms of exercise best adapted for prevention of chest weakness, or for a chronic invalids or convalescents needs. These are not claimed to be exhaustive, but good at-home substitutes for more elaborate systems or for out-of-door activities.

Of course daily constitutional walks, hill climbing, horseback riding (with which for good effects bicycling, though excellent, can hardly compete because of the usual stooping attitude of the rider), tennis, ball playing, rowing, hunting, and fishing, are all most excellent forms of exercise, to be preferred by those for whom they are severally suited and safe because of the interest excited and resulting mental relaxation. But for the systematic home building up and strengthening of the weakened respiratory apparatus, these rules are submitted for individual practice with this distinct proviso: that doubtful or unsuitable conditions, feverish or irritable cases are always to be referred to the patients physician for his choice of procedure. In fact, these forms of exercise are purposely graduated to enable the attending physician to determine how far a given person should proceed in a given time.

Rule I. Cultivate regularity in the care of your body; regularity, without so much precision as to be tiresome, in eating, sleeping, exercise, bathing, and the daily movement of the bowels. This for some people is a cardinal requisite of good health.

Let it be remembered that "procrastination is the thief" of vigor and vitality as well as "of time;" and the languor and indigestion, with or without constipation of the bowels, which are the usual precursors of chronic pulmonary ills, favor mental irresolution and irresponsibility which, are in no small degree to be overcome by regularity.

Rule II. Look after the condition of your bodys surface, see that the skin is clean and therefore active, perspiration normal, and hands and feet warm. The morning rub down is a good thing. To those, and they are not few, to whom daily plunge or tub baths with soap are unsuited because of too great abstraction of bodily heat and lessening of the protective influence of a naturally oily skin, the rub down

When the bowels are torpid, and hands and feet cold, the sipping of a glass of water as hot as can be swallowed an hour before breakfast is of much benefit; and so, especially if any sign of rectal weakness exists, are profuse flushings of the lower bowel with hot water from one to three times a week.

I have usually directed patients on retiring at night to take these enemata lying down, from a fountain syringe, and to hold from one to three quarts of the hot water in the bowel for twenty minutes if possible.

is particularly useful. It is all right for cleanliness, but its chief object is rather the resulting reaction. The warmth, glow, and exhilaration of this reaction after a bath is the criterion as to its length and coldness. To some, the most feeble, it may be enough to bathe above the waist in the morning on rising and below the waist on retiring at night, and to splash the surface quickly with tepid or cold water with the hand or wet towel for half a minute and then vigorously rub with a crash towel for three to five minutes. Others, not so delicate, can stand in a bath tub and squeeze a large sponge dipped in cold water on the back, and, after quickly going over the body, give themselves the towel rubbing. This is an excellent thing for anyone to do, even if perspiring from exercise, provided the resulting reaction comes quickly as it almost always will. To rub the body with cocoanut oil after a bath is an excellent procedure, especially in dry, cool climates.

Rule III. Live as much as possible in the open air. Let your exercise be carried on there, or with windows open if in the house. The more outdoor activity you have, the less gymnastic work will be required. Get as much sleep as possible (nine or more hours) during the night time in: a well ventilated room; and a half hour nap at noon is also excellent. Do not worry but take life easy, (as the Irishman has it, "If ye cant take it aisy, take it as aisy as ye can.")

Rule IV. Think about your chest position many times a day. Whether sitting, standing, walking, or riding, get into position. This requires thought and will, till correct breathing becomes automatic. The accompanying cuts from Checkley show the correct (I) and incorrect (II) chest positions.

The correct position is, head up and chin in; chest expanded front and shoulders back and down, the neck being back far enough to press against the collar. If you stand in this way when your upper garments are being fitted, your clothes will not be a hindrance to right respiration as sometimes happens. In this correct position, frequently practice breathing by long continued inspiration; as you draw in your abdomen, swell out the sides of your chest and protrude your sternum (breast bone).



Night and morning, while your chest is thus inflated, practice briskly rubbing the chest from the sternum backward with the palms of the hands.

Eule V. Do not let the conventionalities of society prevent your free and natural respiratory movements. The clothes should not constrict the chest or any part of the body. This advice is of most value to the ladies. Ordinarily, a woman with her corsets on cannot properly perform the valuable exercises hero described. She is usually deceived as to the amount of pressure exerted by these vices, so evenly adjusted to her pliable frame. She is positively deceived as to the support the corset is supposed to give toward holding up the trunk of the body. It is simply the acquired weakness of back and side muscles, caused probably by long use of the corset, which she feels it relieves. Had she properly used these muscles, the delusion would have been unnecessary (?).

The accompanying cuts show the natural and correct female form without corset (III) and the deformed chest with corset (IV). It takes a great deal of effort and self-control on the part of a young woman to prevent the corset having this effect. Some women have had the good sense to put two towels lengthwise underneath their corsets when their dresses were being fitted, so as to providentially save for themselves so much more breathing space. Doctors have preached, though unsuccessfully, about the constriction and crowding upward of the liver and stomach, and downward of the abdominal and pelvic organs, due to tight lacing; but, with reference to exercise, the chief effect to be lamented is the unnatural variation or partial annulment of respiration. The summit respiration is exaggerated and the inferior costal or diaphragmatic movement prevented. There is a wonderful amount of good in the systematic practice of these exercises to those women, especially the younger ones, who perchance appreciate the import of the foregoing and are willing to substitute a loose fitting corset waist for the usual corset ribbed with steel, whalebone, or their equivalents. Whether for males or females, the garments covering the trunk of the body should be loose fitting, and the covering next the skin is best of genuine wool of weight and texture to suit the season and individual needs.

Rule VI. Practice front arm exercises and respirations combined, with vigor and effort according to your strength and ability for the space of three to ten minutes three to six times a day. The accompanying cut illustrates one of these—the third.

First: Stand in correct position (Rule IV), fully inflate the lungs as you slowly raise the arms from the sides to the vertical, touching thumbs or backs of hands over head, and exhale as the arms descend.

Second: Draw back arms from front horizontal, with palms up, until the elbows are as far back past the sides of the body as possible, the elbows being kept close to the body. Inhale as you draw arms back, exhale as you return to position. Repeat this movement four to ten times. Last time, when elbows are back, slap chest lightly and quickly fifteen to twenty times.

Third: (See cut V) Get into position. Slowly raise arms from side forward, fingers straight out, till palms meet in front of forehead, fully inflating the lungs all the while. Then hold the breath until the largest possible circles are completed by both arms moving symmetrically over backward to position. Then exhale and repeat four to ten times.

. An excellent variation of this movement is to step out diagonally to the right with the right foot as you draw in your breath, and swing up your arms front over the head as far as possible. Then alter-

#### THE DRY SWIM.

nate several times by doing same to the left also, each time coming back to position by a spring with the advanced leg.

Fourth: "The dry swim." Position, arms straight down at sides; exhale all possible as you go down

to floor. Then, resting on toes, slowly inhale as you rise to position (see cut VI) making large swimming circles, with arms stiff and palms out. Repeat four to ten times.

#### CORNER BREATHING EXERCISE.

Rule VII. According to your ability and freedom from any acute conditions, substitute or add to the foregoing the fixed clearest breathings.

A. Extend arms nearly to or above a horizontal at shoulders and walk thus into the corner of the room; then breathe four to ten full breaths. Do no more than you can accomplish without pain. The ability to get fully into the corner, with arms high, will "come by practice.

B. Inhale as arms are extended laterally from correct position, keep arms horizontal and face and feet to the front while arms and chest are swung quarter round; then with one stiff knee swing body forward until extended fingers nearly or quite touch the floor. Return to position and exhale. Take another breath and repeat with other arm forward. Alternate these movements four or ten times.

#### IX.

#### SWINGING CHEST EXERCISE.

C. Place two chairs about twenty inches apart and, with body stiff and straight, rest on toes and hands, as shown in cut. When down between the chairs take four to ten full inspirations and expirations. Raise the body from the down position to the extended arms, and repeat according to strength and ability to do so without too great fatigue.

If such severe exercise by practice becomes a pleasure and not a strain to a given individual, it is one of the strongest proofs possible of his power to resist

#### DOWN BETWEEN CHAIRS.

pulmonary disease. They should be—the last especially—gradually reached by weeks or months practice of milder forms. If possible to combine them with the climbing of hills or frequent excursions to the mountains, the results will be so much the more salutary. As Professor R. J. Roberts, of Boston, says: "As a man breathes, so he lives. To half breathe is only to half live. So he must slowly and carefully develop his breathing powers."

#### FOOD

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